DOCUMENT RESUME

ED 319 644 SO 020 769

AUTHOR	Gerber, Rod, Ed.; Lidstone, John, Ed.
TITLE	Developing Skills in Geographical Education.
INSTITUTION	International Geographical Union.
REPORT NO	ISBN-0-7016-2530-9
PUB DATE	88
NOTE	361p.; Illustrative figures present various legibility problems.
AVAILABLE FROM	International Geographical Union, Commission on Geographical Education, Social Studies Department, Kelvin Grove Campus, Brisbane College of Advanced Education, Queensland 4059 Australia.
PUB TYPE	Guides - Non-Classroom Use (055) -- Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF01/PC15 Plus Postage.
DESCRIPTORS	*Continuing Education; *Curriculum Development; Elementary Secondary Education; Foreign Countries; *Geography; *Geography Instruction; *Research; Skills; Students; *Teaching Styles

ABSTRACT

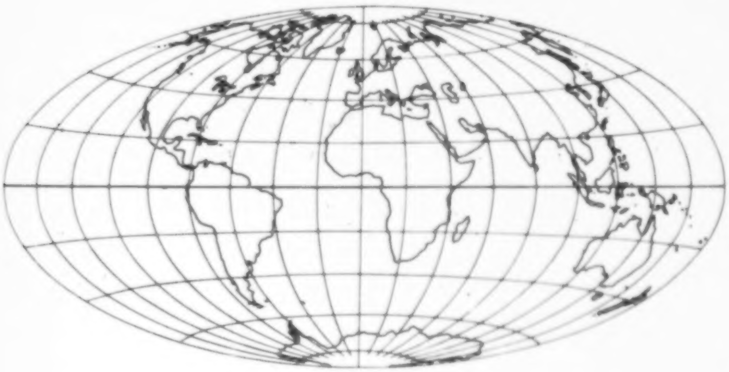
At one level, the title of this book implies a concern for the skills of those whose profession is to teach geography to the young people of the world. These skills include understanding students, the subject matter of geography, the strategies that may be adopted in the classroom, and ultimately, the ways in which these are combined to create effective geography criteria. At another level, skills in geographical education may be taken to refer to those skills that students may be expected to develop as a result of their experiences in their geography classrooms. The book consists of six sections, each of which addresses a major issue: (1) teaching styles; (2) learners' skills and abilities; (3) skills for living; (4) curriculum development; (5) continuing education; and (6) research in geographical education. Each section begins with an overview followed by 6 to 10 articles by international geography educators addressing the issues of developing skills in various contexts. The articles are illustrated with numerous charts, graphs, and figures, and most include a bibliography. (JB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED319644

IGU

DEVELOPING SKILLS IN GEOGRAPHICAL EDUCATION



U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
● Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
DR. R.V. GERBER
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SO 020 769

Edited by Rod Gerber and John Lidstone

BEST COPY AVAILABLE

3 6 90
4

DEVELOPING SKILLS IN GEOGRAPHICAL EDUCATION

First published in 1988 by the
International Geographical Union
Commission on Geographical Education
with The Jacaranda Press

Printed and bound in Australia by
Watson Ferguson and Co., Brisbane

© International Geographical Union
Commission on Geographical Education

National Library of Australia Card Number and
ISBN 0 7016 2530 9

Available from

The International Geographical Union
Commission on Geographical Education
C/- The Social Studies Department,
Kelvin Grove Campus,
Brisbane College of Advanced Education
Queensland 4059
Australia

DEVELOPING SKILLS IN GEOGRAPHICAL EDUCATION

Edited by

Rod Gerber and John Lidstone

IGU

INTERNATIONAL GEOGRAPHICAL UNION
COMMISSION ON GEOGRAPHICAL EDUCATION

with

THE JACARANDA PRESS

CONTENTS

Table of contents v

List of contributors ix

Preface xiii

Introduction: Developing skills in geographical education 1

1: The geographical educator as an expert . . . *Rod Gerber* 3

Section A: Teaching styles in geographical education 9

2: Teaching styles in geographical education . . . *Michael Naish* 11

3: Teaching style? A case study of post graduate teaching students observed . . . *Frances Slater* 20

4: Problems of new town development - using values in geography lessons . . . *Chi-chung Lam* 27

5: Teaching styles in reading and interpreting topographical maps - the Nigerian experience . . . *Julie I.N. Okpala* 31

6: An approach to teaching data collecting and processing skills in geography . . . *Kevin Laws* 39

7: Teaching styles and computer assisted learning in geography . . . *Henk Trimp* 44

8: Teaching and learning geography through field work . . . *John Lidstone* 53

9: Styles of teaching geography in a developing country - Brazil . . . *Marcos Mucciolo* 60

Section B: Developing learners' skills and abilities in geography 63

10: Skills in school geography: from teaching to learning . . . *Bernard Cox* 65

11: Thinking geography with maps . . . *Joop van der Schee* 76

12: Effects of practical experience and sequential skills in map reading . . . *Liaw Beng Teck* 80

13: Traditional Danish practice in cartographic learning . . . *Troels Raadam* 84

14: Figures in the landscape: sustaining the social dimension in geography teaching . . *Louis Murray* 90

15: The public inquiry as a teaching approach . . . *David Boardman* 94

16: Deserts - a sequence of lessons in problem solving . . . *Gosta Wennberg* 103

17: The development of abilities and skills through the integrated geography syllabus in Uganda . . . *Erisa Kyagulanyi* 109

Section C: Developing skills for living through geographical education 119

18: Skills for living: a geographical perspective . . . *John Fien* 121

19: The development of environmental literacy through geography . . . *Ove Biilmann* 129

20: The use of computers in local environmental studies in the lower secondary school . . . *Keld Larsen* 135

21: Local studies and the use of general applicational programs in ordinary classroom geography . . . *Tonny Hubbe* 142

22: Teaching oral and groupwork skills in geography . . . *Alan Jenkins and David Pepper* 147

23: Development issues: sympathy and paternalism, empathy and realism . . . *Roger Robinson* 152

24: Civic education through geography . . . *Yee-wang Fung* 156

25: Roleplay in geographical education: a case study of "City Traffic" . . . *Hartwig Haubrich* 164

26: Critical skills in geography teaching . . . *Rob Gilbert* 169

27: Geography, decision making and socio-economic development issues in Zambia . . . *Fashion Phiri* 172

Section D: Curriculum developments in geography for the 1990s 179

28: Curriculum developments in geography in the 1990s . . . *Norman Graves* 181

29: An epistemological and didactic reflection on geography . . . *Jean Marechal* 188

30: Geography in the primary curriculum: using the world's schools to promote empathy . . . *Bill Marsden* 195

31: An approach to the integration of geography and history: finding a place for geography in the K-12 curriculum . . . *Christopher Salter* 203

32: Recent trends in developing geography curricula for secondary schools in the Federal Republic of Germany . . . *Hartmut Volkmann* 207

33: Objectives for field work and laboratory studies in geography at primary and secondary schools . . . *Sonia Maria Carneiro* 212

34: Uses of Multi-Digit Testing in geographical education . . . *Paul S. Anderson* 215

35: Stimulating endogenous textbook development in the Caribbean micro-states . . . *Mike Morrissey* 222

Section E: Developing skills through continuing education 229

36: Continuing education of geography teachers . . . *Michael Williams* 231

37: How to help the untrained geography teacher: an American project example . . . *A. David Hill* 245

38: The demographic transition of population change, a neglected aspect in American geography classrooms . . . *David A. Lanegran* 250

39: The current state of in-service training of geography teachers in Hiroshima prefecture, Japan . . . *Shuichi Nakayama* 253

40: Informing the information society, hard and painstaking work ahead . . . *Henriette Verduin-Muller* 256

41: Experiments with a new design for in-service education . . . *Wim Veen* 261

Section F: Research in geographical education 271

42: Research in geographical education . . . *John Lidstone* 273

43: Research in geographical education in the United Kingdom . . . *Ralph Hebden and Elspeth Fyfe* 286

44: Research in geographical education in Nigeria from 1981 - 1986 . . . *Julie Okpala* 298

45: A survey of the teaching of geography in West German schools in the 1980s . . . *Gunter Niemz* 309

46: In search of a more efficient mental image of the world . . . *Ann Verhetsel* 319

47: Applied textbook research in geography . . . *David Wright* 327

48: School-based research into pupils' mapwork difficulties and their solution . . . *Herbert A. Sandford* 333

49: Questionnaire surveys in geography education research, some problems and possible solutions . . . *Philip Stimpson* 339

50: Results of the reform of high school geography teaching in Finland as reflected in student examinations . . . *Lea Houtsonen* 344

51: School atlases in the United States: an analysis of characteristics . . . *Joseph Stoltman and Robert Freye* 350

LIST OF CONTRIBUTORS

Paul Anderson, (Dr.)
227, South Orr Drive,
Normal,
Illinois 61761,
U.S.A.

Liaw Beng Teck,
Institute of Education,
469 Bukit Timah Road,
Singapore

Ove Biilmann, (Dr.)
Royal Danish Institute of Education Studies,
Emdrupvej 101,
Copenhagen NV,
Denmark

David Boardman, (Dr.)
Faculty of Education,
University of Birmingham,
P.O. Box 363,
Birmingham,
England

Sonia Maria Carneiro,
Methods and Techniques of Education Department,
Federal University of Parana Education Sector,
Curitiba,
Brazil

Bernard Cox, (Dr.)
Department of Education,
University of Queensland,
St. Lucia,
Brisbane,
Australia, 4067

John Fien,
Social Studies Department,
Kelvin Grove Campus,
Brisbane College of Advanced Education,
Queensland,
Australia, 4059

Robert Freye,
Kalamazoo,
Missouri,
U.S.A., 49008

Yee-Wang Fung,
School of Education,
The Chinese University,
Sha Tin,
New Territories,
Hong Kong

Elspeth Fyfe,
Sheffield City Polytechnic,
Totley Hall Lane,
Sheffield,
England

Rod Gerber, (Dr.)
Social Studies Department
Kelvin Grove Campus,
Brisbane College of Advanced Education,
Queensland,
Australia, 4059

Rob Gilbert, (Dr.)
School of Education,
James Cook University,
Townsville,
Australia, 4810

Norman Graves, (Professor)
University of London Institute of Education,
20, Bedford Way,
London W.C.1
England

Hartwig Haubrich, (Professor)
Pedagogische Hochenschule Freiburg,
Kunzenweg 21,
Freiburg,
West Germany

Ralph Hebden, (Dr.)
Sheffield City Polytechnic,
Totley Hall Lane,
Sheffield,
England

A. David Hill, (Professor)
Geography Department,
Box 260,
University of Colorado,
Boulder,
Colorado, BO 501,
U.S.A.

Lea Houtsonen, (Dr)
University of Helsinki,
Department of Geography,
Hallituskatu 11 - 13,
SF-00100 Helsinki,
Finland

Tonny Hubbe,
Royal Danish School of Education Studies,
Emdrupvej 101,
Copenhagen NV,
Denmark

Alan Jenkins, (Dr.)
Faculty of Environment,
Oxford Polytechnic,
Oxford,
England

Erisa Kyagulanyi,
Institute of Teacher Education,
P.O. Box 1,
Kyambolo,
Kampala,
Uganda

Chi-Chung Lam,
2507, Oi Ming House,
Yau Oi Estate,
Tuen Mun,
Hong Kong

David Langegran, (Professor)
Geography Department,
Macalaster College,
1600 Grand Avenue,
St. Paul,
Minnesota,
U.S.A. 55105

Keld Larsen,
Royal Danish School of Education Studies,
Emdrupvej 101,
Copenhagen NV,
Denmark

Kevin Laws, (Dr.)
Faculty of Education,
University of Sydney,
Sydney,
Australia, 2006

John Lidstone, (Dr.)
Social Studies Department
Kelvin Grove Campus,
Brisbane College of Advanced Education,
Queensland,
Australia, 4059

Jean Marechal,
Inspecteur Pedagogique Regional,
Rectorat de Grenoble,
21 Rue Pierre Larousse,
Dijon,
France 21000

Bill Marsden,
Faculty of Education and Extension Studies,
University of Liverpool,
19, Abercrombie Square,
Liverpool,
England

Mike Morrissey,
Faculty of Education,
University of the West Indies,
Mona, Kingston 7,
Jamaica

Marcos Mucciolo,
Rua General Guades da Fontoura 560,
Apto 101,
Barra da Tijuca,
Rio de Janeiro 22600,
Brazil

Louis Murray, (Dr.)
C/o Bedford College of Higher Education,
Bedford,
England

Michael Naish,
University of London Institute of Education,
20, Bedford Way,
London W.C.1
England

Shuichi Nakayama, (Dr.)
Department of Geography,
Hiroshima University,
Hiroshima,
Japan

Gunter Niemz, (Professor Dr.)
6000 Frankfurt am Main,
Schumannstrasse 58,
West Germany

Julie Okpala, (Dr.)
Department of Education,
University of Nigeria,
Nsukka,
Nigeria

David Pepper, (Dr.)
Faculty of Environment,
Oxford Polytechnic,
Oxford,
England

Fashion Phiri, (Dr.)
Department of Education,
University of Zambia,
Box 32379,
Lusaka,
Zambia

Troels Raadam,
Royal Danish School of Education Studies,
Emdrupvej 101,
Copenhagen NV,
Denmark

Roger Robinson,
University of Birmingham,
Department of Curriculum Studies,
P.O. Box 363,
Birmingham,
England

Christopher Salter, (Professor)
Educational Media Division,
National Geographic Society,
Washington, D.C.,
U.S.A.

Herbert Sandford, (Dr.)
College of St. Mark and St. John Foundation,
Derriford Road,
Plymouth,
England

Joop van der Schee, (Dr.)
Geografisch Instituut,
Vrije Universiteit
Postbus 7161,
1007 MC Amsterdam,
The Netherlands

Frances Slater, (Dr.)
University of London Institute of Education
Bedford Way, London W.C.1
England

Philip Stimpson, (Dr.)
Department of Education Studies,
University of Hong Kong,
Hong Kong

Joseph Stoltman, (Professor)
Western Michigan University
Kalamazoo
Michigan, Missouri,
U.S.A.

Henk Trimp, (Dr.)
Geografisch Instituut,
Vrije Universiteit
Postbus 7161,
1007 MC Amsterdam,
The Netherlands

Wim Veen, (Dr.)
Institute for Teacher Education,
State University, Utrecht
Heidelberglaan 2
3584 CS Utrecht,
The Netherlands

Henriette Verduin-Muller, (Professor)
Valklaan 17,
Maartansdijk, 03461-1378,
The Netherlands

Ann Verhetsel, (Dr.)
Institute for Social and Economic Geography,
Catholic University of Leuven,
De Croylaan 42,
B-3030 Heverlees,
Belgium

Hartmut Volkman, (Prof. Dr.)
Gedudlerweg 33,
D-4322 Sprockhovel 1,
West Germany

Gosta Wennberg
Malma Ringvag 23,
752 45 Uppsala
Sweden

Michael Williams, (Professor)
University College of Swansea,
Department of Education,
Hendrefoilan,
Swansea,
Wales.

David Wright,
University of East Anglia,
School of Education,
Norwich,
England

PREFACE

Skills in *Geographical Education* is an ambiguous title for a book. It is intentionally so.

At one level, the title of this book implies a concern for the skills of those whose profession it is to teach geography to the young people of the world. These skills include understanding our students, the subject matter of geography, the strategies which may be adopted in our classrooms and ultimately, the ways in which these are combined to create effective geography curricula. As one of us argues in the first chapter of this book, someone who has mastered all the skills of teaching geography may indeed be regarded as an expert in the field.

At another level, *Skills in Geographical Education* may be taken to refer to those skills which our students may be expected to develop as a result of their experiences in their geography classrooms. Such skills may be learned or developed within the context of geographical education, but their ultimate purpose is to enable our students to live more fulfilling lives. In this sense skills gained in geography lessons become what Michael Naish has called a "medium for education".

The occasion of the Symposium of the International Geographical Union Commission on Geographical Education, which provides a forum for experts geographical educators from all over the world, gave an opportunity to invite a number of our international colleagues to share the perceptions of these wide ranging and fascinating area of developing skills in geographical education. The result is the present volume. The book consists of six sections, each of which addresses a major issue relating to the theme:

- Teaching styles,
- Learners' skills and abilities,
- Skills for living,
- Curriculum development,
- Continuing education, and
- Research in geographical education.

Each section begins with an overview before geography educators from around the world explain ways of addressing the issues of developing skills in various contexts.

Thanks must be extended to all those who have contributed to making the germ of an idea which emerged early in 1985 into the reality you now hold. Above all we thank all the authors who have agreed that any royalties which may accrue may be used to further the work of the Commission by assisting colleagues from less wealthy countries to attend future Symposia.

Here in Brisbane, Lyndall Cooper keyed the manuscript with great accuracy into a BBC microcomputer. Bruce Mitchell and David McBryde converted the files to a form acceptable to an Apple Macintosh so that Lesley Cassidy could arrange the layout. Lizbeth Veal prepared the graphics. Rosslyn Clayton typeset the tables. Finally, Greg Browne of The Jacaranda Press arranged for the book to be printed and bound. To all these people, we also offer our grateful thanks.

With such a variety of contributors coming from different cultural and language bases, the task of creating a unified volume, accessible to an international readership, has been immense. Consequently, we have had to undertake a considerable editorial responsibility. We trust that we have accomplished the task in a sensitive and caring way.

Rod Gerber and John Lidstone

Brisbane 1988

Introduction

Developing skills in geographical education

1: THE GEOGRAPHICAL EDUCATOR AS AN EXPERT

Rod Gerber

It was the beginning of another teaching term at the suburban secondary school. Martine Malkowsky, one of the six geography teachers in the school, was busy preparing for her lessons with her upper Secondary students. Throughout the day, she would make quite a variety of decisions that would affect her as a geography teacher and her class of twenty students in their urban geographical studies.

One specific set of decisions that Martine would make related to the unit on Urban Problems that she was preparing for her class. Throughout the morning, she made decisions about:

1. What to teach in this curriculum unit?
- Can the students understand the concepts of atmospheric inversion layers and residential decay?
- Will the development of interview and questioning skills assist the students to investigate the problems that exist in their urban area?
- To what extent should the students undertake local, national and international studies to illustrate the range of urban problems?

2. How to teach the unit?
- Should I use an expository or a student-oriented approach to the unit?
- Should the students undertake some local field studies?
- Can I borrow the socio-economic database from the school library?
- Should the class activities include a simulated courtroom inquiry over a local community issue such as property rezoning?

3. What the students already know about the topic?
- How can I find out the students' perceptions of urban problems?
- When I obtain this information, how can I make sense of the data?

Later in the day, at the weekly meeting of the geography teachers in the school, Martine raised the issue of the place of the Urban Problems unit in the year program. This provoked a lively discussion amongst the teachers on the sequencing of units in the course. In fact, it was all part of the session planned by the Geography Co-ordinator, Nadia McGuigan, to broaden the teachers' understanding of the curriculum planning process used in their school.

By obtaining answers to these questions and by participating in these professional activities, Martine demonstrated her ability to make decisions and to use skills which reflected the expertise that she had developed in her pedagogical training and teaching experience. She illustrated the concept of the geographical educator as an expert - a concept that ought to be recognised in the increasingly specialised world in which we live.

What is an expert in geographical education?

The concept of an expert has become prominent in the last decade as people have tried to simulate human thinking on computers using the process of knowledge engineering. This process involves transferring knowledge from an expert to a computer program through the construction of an expert system. Waterman (1986: 6-8) details that the powerful body of knowledge which underlies any expert system consists of: high-level expertise that aids problem-solving; predictive modelling power that provides the desired answers for a given problem situation and shows how they would change for new situations; an institutional memory that represents the accepted operating procedures and policies; and a training facility for people who wish to use the system.

It is the focus on the first of these attributes - the high level of expertise - that helps us to clarify how geographical educators are specialists in education. Johnson (1983: 78-79) has synthesised the qualities of experts. He proposes that experts, because of their training and experience:

1. know what must be learned;
2. are able to do things that most people cannot and so are proficient at generalising information;
3. are smooth, fluent and efficient in their actions;
4. know many tricks and caveats for tackling problems;
5. are smart at dismissing irrelevant information in order to get to the basic issues;
6. can recognise problems as instances of familiar types of problems;
7. can transfer performance across specific task situations.

I propose to demonstrate how these attributes can be applied to geographical educators and so claim that they are experts in their own right.

1. Knowledge of what must be learned.

A perusal of the text- and reference-books written recently by geographical educators reveals the types of knowledge and competencies that skilled educators must possess in their subject. Titles such as *Learning through Geography* (Slater, 1982), *Geographical Education: Reflection and Action* (Huckle, 1983), *Teaching Geography for a Better World* (Fien and Gerber, 1988) and *The Geography Teachers' Guide to the Classroom* (Fien, Gerber and Wilson, 1988) suggest that geography is a medium for education that contains: distinctive perspectives for studying social and environmental issues; distinctive methods for teaching and learning the subject and an understanding of specific competencies required to master the subject. A closer examination of the contents of the above books reveals that this specialised knowledge includes:

a) a wide variety of social, political, economic and environmental issues that relate to people's interaction with their world;
b) understanding of different ideologies and philosophies that underlie the approaches that educators take when they teach geography;
c) a range of methods for teaching and learning geography both in the formal classroom and in the field;
d) techniques for developing effective curriculums to teach geography in particular local, state or national settings;
e) techniques for evaluating the effectiveness of all aspects of geographical education, including curriculum plans, teaching methods, curriculum units, and resources, and the diagnosis and the assessment of student performance;
f) a range of skills that can enhance effective living.

Acquisition of this knowledge is an ongoing, deliberate experience that occurs through formal and informal settings. It is clarified through a variety of continuing educational experiences, personal research and reading, and discussions with one's peers.

2. Proficiency to generalise information and to do things that most people cannot.

Geographical educators who are perceived as leaders in their field are people who have developed the abilities to generalise the following information:

a) the concepts, generalisations and principles that underpin the structure of geography;
b) the processes that are involved in making decisions to answer the key questions that geographers normally ask when they make an investigation of an environmental issue;
c) the scope of physical, cognitive and social skills used to make any geographical investigations;
d) the range of feelings, perceptions, attitudes and values that people allow to impinge on geographical investigations and which colour their resulting decisions.

This proficiency is developed as a consequence of deliberate studies in both geography and education in which people learn the conceptual bases and methodologies of both disciplines. It, also, is extended by the consideration of allied areas of knowledge, e.g. politics, economics, history, sociology and psychology. Strategies and concepts may be borrowed from them and adapted to geographical studies to enable students to make more comprehensive investigations. For example, the concept of political literacy has been adapted in the studies of environmental conflict studies and perception studies have been adapted from psychology to develop values enquiries in geography.

3. Smooth, fluent and efficient actions.

The expertise developed through acquired knowledge of geographical education and the proficiency to generalise information is reflected in these educators' actions. Smoothness in their actions is evident in the manner by which geographical educators conduct studies based on the key questions that geographers ask:

- What is the geographical phenomenon?
- Where is it distributed in a designated area?
- Why do these patterns/relationships exist?
- What are the environmental consequences of this pattern/relationship?
- How ought this environmental situation/issue be improved?

Such a logical treatment of a geographical issue enhances a fluent, efficient approach to education. It is an approach that progresses beyond factual recall of data and the general description of geographical patterns. Its efficiency is closely associated with the extent to which students engage in decision-making activities under the guidance of a geographical educator. All of this reasoning is closely related to the focus of conducting geographical enquiries. Educators, following this process, become quite practised at making decisions associated with the development of curriculum units which take a specific angle in studying some geographical issue, e.g. Are cities good places to live in? Geographical educators develop fluent responses to curricular issues because they are competent at communicating in oral, verbal, graphic, numerical and physical forms of information. Therefore, these educators can decide when it is more appropriate to use a verbal description, a map, an interview, a table of statistics, a field activity, a pop song or a flow diagram to communicate effective geographical information in a study on environmental hazards.

4. Knowledge of tricks and caveats for tackling problems.

As mentioned above, geographical educators make efficient use of their classroom activities by focussing on social and environmental issues and by using a distinctive set of key questions. To make decisions associated with these questions the geographical educators become adept at making decisions associated with learning that are based on the students' skills, abilities, personal geographies and the environment in which they live. The "tricks" possessed by geographical educators are learned through: the acquisition of management skills, especially in making field studies; the diagnosis of the students' abilities, preferences and aspirations for life; the co-operative planning experiences implemented in many schools, especially in relation to curriculum development and assessment, and continuing education experiences in which geographical educators learn from their peers. The idea of "tricks" varies across countries as different cultures and educational systems influence the extent to which different practices can be used. For example, the art of inquiry learning may be promoted in selected countries, but it may not relate to geographical education in another country because of the government policy on education in that country.

Similarly, caveats in geographical education will vary according to the particular country and its governmental policies. What may be a warning in one country may be a guide for action in another. For example, guidelines for computer-assisted learning in geography may be seen as constructive statements for geographical educators in British secondary schools, but they are another form of warning to educators in countries that cannot afford micro computers in their classrooms. However, despite these varying contexts, the skilled geographical educators have become aware of such warnings and have developed their own solutions for addressing such problems in their own contexts. As one educator from an African country mentioned to me when we were discussing the use of remote sensing in teaching geography in his country:

"We do not teach it at the moment in the schools, because it is a new technology and because the schools do not have the money to purchase the appropriate resources. However, I see the value of this resource and its relevance to geography teaching. In ten years time, when we are ready to use remote sensing in geography teaching I will have the expertise to help our government to implement it into our education system."

5. Expertise at getting to basic issues.

Skilled geographical educators are people who can see through the variety of smoke screens that are erected in the name of geographical education. They are able to discern the priority issues as opposed to the peripheral issues, and so basic issues are addressed before peripheral considerations.

The basic issues that geographical educators need to consider include the following:

a) What should be learned in geography?
b) How should learning occur?
c) How do we know what has been learned?
d) How useful are the skills, concepts, generalisations and values that are learned or refined in the geographical studies?

In considering these issues, it is very easy for geographical educators, as for most educators, to talk around the issue in the form of a brain-storming session and still have not clarified the problem, its elements and possible resolutions of it for teaching geography. Expert geographical educators are adept at comprehending the nature of a problem, e.g. using simulations in geography teaching, and they are able to: comprehend the advantages and disadvantages of using simulations in geography lessons, evaluate existing geographical simulations and be competent to design such an educational experience. Their lucid reading of the problem and their understanding of potential solutions allows them to be natural leaders in the continuing education of geography teachers.

6. Ability to group and classify problems in geographical education.

Geographical educators may encounter a wide range of problems or challenges in their professional lives. Some of these problems relate to the geography being taught and learned. Others will relate to the educational experiences involved in learning geography. Experienced geographical educators are able to classify these problems according to the above sub-division and to solve each problem according to the guidelines that they have learned for each basic type. Educational problems for geographers may be further divided into ones related to teaching methods/didactics, curriculum development, continuing educations, skills development and applied research. Skilled geographical educators will be adept at identifying which of these educational problems theirs is and they will have a number of remedies available to deal with each type of problem. For example, a geography teacher approached an experienced educator over the problem of the most effective teaching method for her students. To resolve this problem, the experienced educator asked a number of questions concerning the school policy on teaching, the students' abilities, their previous experiences in geography, the availability of resources, the teacher's philosophy to geographical education and the students' perceptions of the proposed units of study. Upon receiving detailed responses to these areas of concern, the geographical educator is normally able to suggest the must useful style of teaching in the continuum from teacher-dominated approaches to student-based approaches. Then, the expert is able to suggest more explicit ideas for the development of a suitable curriculum unit to implement the proposed teaching style.

7. Ability to transfer performance to other task situations.

Geographical educators are normally required to teach students in a variety of learning situations that occur in a variety of educational systems under different political settings. Those educators that we term as experts have acquired a mastery of different teaching methods. They know the strategies that are necessary for use in an expository classroom lesson as opposed to those involved in a library research activity. Similarly, they know the strategies to use for developing critical thinking skills or mapping skills.

As teachers, these experts have internalised a wide range of general teaching skills and competencies learned from geography and kindred areas of knowledge. When particular situations arise in their familiar setting or in a foreign educational setting, these people are able to transfer the internalised skills and competencies to a new learning situation and intuitively provide constructive solutions to the teacher who is seeking assistance. This consultancy role is vital in the continuing education of trained geography teachers for it offers the teachers exemplars for addressing their own teaching challenges.

Developing expertise in geographical education

How do people such as geographical educators become experts? Johnson (1983, 79) has synthesised the research findings of people such as Fitts (1964), La Berge (1973), Mandler (1975), Norman and Bobrow (1975) and Shiffrin and Dumais (1981) to conclude that there are three stages in the development of expertise. These are:

1. The stage of cognition in which people learn "from instruction or from the observation of performance" what actions they should take in specific circumstances.
2. The associative stage of learning in which the relationships learned in Stage 1 are practised until they become accurate, efficient and fluent.
3. The stage of automacy where, through overpractice, the practised relationships are carried out "without thinking".

For geographical educators, it is possible to show that people who may be regarded as experts have passed successfully through each of the above stages.

During the stage of cognition, geographical educators learn: the desirable strategies to take to teach the subject; the conceptual understandings and competencies in geography that students will learn in their geographical studies; the processes of curriculum development and evaluation; strategies for understanding students and the ways they learn geography and the selection of resources to use in the teaching of geography. The development of cognition occurs in the pre-service training of geography teachers and continues during the professional growth of each individual. It is unlikely that pre-service training will do much more than establish the basic building blocks for the development of expertise. Individuals need to undertake a deliberate program of continuing education which may involve post-graduate educational studies, a variety of in-service experiences, regular reading and informal discussions with one's peers. This stage of cognition does not cease for expert geographical educators. Rather, it is a stage which continues through their professional lives as these educators refine their understanding of geographical education and the way it adapts to the changing societal needs.

Geographical educators become involved in the associative stage of learning when they put into practice the variety of basic learnings they have mastered. Such practical experiences occur frequently as the educators refine their trade as geography teachers. They include: the actual teaching of geography, course development and planning activities both within schools and across educational districts or regions. The increase in accuracy or proficiency by geographical educators is recognised when as teachers they are offered the more senior classes to teach; they acquire promotions to become the co-ordinators of geography in their schools or they get invited to lead in-service workshops on aspects of geographical education. Their increased efficiency and fluency in geographical education occurs through ongoing practice at teaching geography or participating in different curriculum development tasks. This practice involves deliberate refinement of the basic strategies developed in pre-service training in a variety of educational settings so that the educators can generalise about the approaches and methods that may be used effectively in geographical education.

The stage of automacy is reached when geographical educators are readily able to apply their well-honed knowledge and skills to whatever educational situation they encounter. It is a time when these educators can make effective decisions once they are aware of the paramaters associated with the particular geographical problem. For example, if a geography teacher wanted to plan a field study to an industrial area to investigate the impact of inertia on the economic development of the area, the expert educator should be able to suggest appropriate foci for investigation, e.g. age of factories in the area and changes to transport routes, as well as effective methods for implementing the actual investigation such as the development of probing interview schedules, video-recording observations and the collection of samples for later analyses. Once it is recognised that geographical educators have reached this stage of automacy, it often happens that these people become invited to lead learning sessions for educators at earlier stages of development. Such leadership is most evident in invitations to address conferences, to lead seminars and workshops which really are forms of training for potential experts in geographical education, and in formal consultations that occur between a geographical education expert and the teachers in a particular school. However, the stage of automacy is acquired, it occurs over a period of concerted learning, practice and acquired experience.

The geographical educator and expert systems

Expert systems are the attempts that have been made to simulate the decision-making actions of experts in a field on computer systems. If successful, such systems can offer efficient, accurate solutions to particular problems in an area of learning. These developments have occurred because human experts have a relatively large long-term memory for storing facts, principles, generalisations, events and other knowledge, but a very limited short-term memory. To my knowledge expert systems have been most widely developed in fields such as medicine, engineering and in other fields of science. Nothing like this has been developed so far in geographical education. However, there may be scope to build upon the expertise development by geographical educators to create a system that geographical educators can use to solve some of their regular problems.

The players involved in such an expert system are detailed in Figure 1.1. They include the computer specialist or knowledge engineer who knows how to construct the expert system using different tools or instruments; the domain expert who has the knowledge for producing good solutions to particular problems in the field, the support staff who assist the knowledge engineer to add data to the expert system and the user who seeks answers from this artificial system. In this instance, expert geographical educators could be the domain experts whose cumulative knowledge is harnessed by the knowledge engineers as the content basis for an expert system on geographical education. The exact nature of this sytsem would need to be defined as the result of a think-tank between expert geographical educators and computer specialists. However, it could focus on teaching methods, diagnosis of students' abilities, assessment of students' learning and curriculum design and development. Such a system could be used internationally by geographical educators to solve their own problems.

The purpose of mentioning expert systems in this context is to highlight the important role that some geographical educators can have as domain experts and to suggest that the sub-themes of this symposium, viz.

1. Teaching styles in geography
2. The development of learners' skills and abilities
3. The development of skills for living
4. The development of curricula for the 1990s
5. The continuing education of geography teachers
6. The skills of researching in geographical education

are important pre-requisites of the geographical educator as a domain expert. These competencies should be fostered if we are to expand the number of experts in geographical education, not just in a few countries, but throughout the world for geographical education is a global issue, not a local or national one. Is it then true, as Neils Bohr says, that an expert is "a person who has made all the mistakes which can be made, in a very narrow field"?

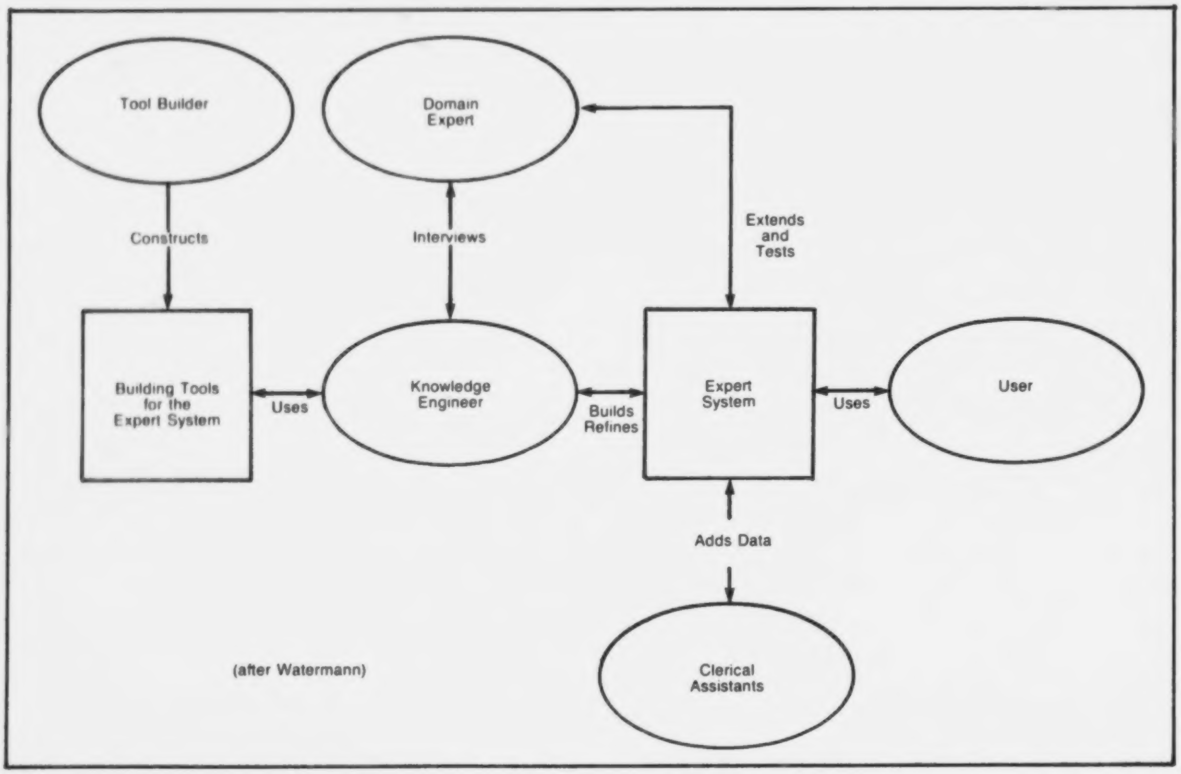


Figure 1.1 The players in an expert system

REFERENCES

Fien, J. and Gerber, R. (eds.) (1988) *Teaching Geography For a Better World*, Edinburgh, Oliver and Boyd.

Fien, J., Gerber, R. and Wilson, P. (1988) *The Geography Teacher's Guide To The Classroom*, 2nd Edition, Melbourne, Macmillan.

Fitts, P. (1964) "Perceptual-motor skill learning", in A. Melton (ed.) *Categories of Human Learning*, New York, Academic Press.

Huckle, J. (ed.) (1983) *Geographical Education: Reflection and Action*, Oxford, Oxford University Press.

Johnson, P. (1983) "What kind of an expert should a system be?", *Journal of Medicine and Philosophy*, 8, 77-97.

La Berge, D. (1973) "Attention and measurement of perceptual learning", *Memory and Cognition*, 1, 268-276.

Mandler, G. (1975) "Consciousness: Respectable, useful and probably necessary", in R. Solso (ed.) *Information Processing and Cognition: The Loyola Symposium*, Hillsdale, Lawrence Erlbaum, Associates.

Norman, D. and Bobrow, D. (1975) "On data-limited and resource-limited processes", *Cognitive Psychology*, 7, 44-64.

Shiffrin, R. and Dumais, S. (1981) "The development of Automatism", in J. Anderson (ed.) *Cognitive Skills and Their Acquisition, Hillsdale*, Lawrence Erlbaum, Associates.

Slater, F. (1982) *Learning Through Geography*, London, Heinemann.

Waterman, D. (1985) *A Guide To Expert Systems*, Reading, Mass., Addison-Wesley.

Section A

Teaching styles in geographical education

2: TEACHING STYLES IN GEOGRAPHICAL EDUCATION

Michael Naish

Introduction

The term "teaching styles" is frequently heard in discussions about teaching geography, but its precise meaning is rarely made clear. It is doubtful whether those engaged in such discussions actually share precisely similar understanding of the concept. If in its broadest meaning, the notion of teaching style has something to do with the ways in which geography is taught, then it has great significance for geographical education because the way the subject is taught affects the way it is learned and this will affect the total educational experience of the students. If this is indeed the case, then it will be helpful to attempt to make the meaning of teaching style clearer and to explore the implications of various teaching styles for the curriculum.

There are further reasons for investigating teaching styles. Such investigations may help us as teachers to consider the significance of style in our curriculum planning at a day-to-day level as well as in broader terms. It may well be that few of us pay close enough attention to the relationship between the content and context of a lesson or series of lessons, the skills to be learnt, practised and developed, and the attitudes to be explored consciously or unconsciously. In each of these decisions, the teaching style to be employed may be highly significant.

Twenty years ago, Ausubel (1968) was somewhat dismissive of discussions of this nature. He noted that much had been written on teaching styles, including considerable pseudo-controversy leading to confused debate. The debate, in his view, was plagued by ambiguity of terms, the emotional use of slogans and an absence of definitive evidence. He felt that the continuing unresolved debate promised few implications for teaching practice. It is, perhaps, that there is still little work of an observational or experimental nature specifically related to the teaching of geography (with some exceptions, such as Stoltman, 1976, see pp. 16, below) and, twenty years on, the debate is still unresolved. Despite Ausubel's reservations about implications for the practice of teaching, the contention of this section of the book is that rather more careful, explicit consideration of the nature of teaching style in relation to the teaching of geography may aid in enhancing the effectiveness of student learning.

Exploring the meaning of the term

1. Method versus manner

In its most general sense teaching style means the way a teacher or a group of teachers go about their teaching. Recourse to the Shorter Oxford English Dictionary provides this definition of "style": *A method or custom of performing actions or functions ... and a manner of executing a task or performing an action or operation.* If we apply these definitions to the way a teacher goes about his or her teaching, then we can usefully suggest that teaching style is about the method of teaching employed as well as about the manner in which a teacher works.

This dichotomy between method and manner is picked up in research into teaching styles. Thus Ausubel (1968) saw one major focus of research to be concerned with lecture methods versus discussion methods, while a second focus was group-centred versus teacher-oriented teaching. These studies were clearly concerned with method.

The work of Flanders (1960) was more concerned with manner, since he investigated whether pupils who were taught by 'indirect' teachers made more progress that those taught by 'direct' teachers. His findings suggest that indirect teachers tend to accept more of the pupils' ideas, ask more questions and give more praise, while direct teachers offer facts and opinions, issue more commands and directions and criticise students more.

While some researchers believe that it is what you do not the way that you do it, others such as Flanders (1960, 1976) suggest that it is the way teachers do it that matters. However, common sense suggests that both what a teacher does and the way she or he does it are significant variables in a teaching-learning situation and that sensible planning would seek to integrate the two.

2. Leadership styles

Some of the early investigations of relevance to teaching style were carried out in 1938 under the direction of Kurt Lewin. These studies were concerned with the way in which groups of children reacted to different styles of leadership. They were thus essentially about the way that you do it. In one well-known experiment conducted by Lippitt and White (1958), two small groups of children were led by adult experimenters who adopted two different leadership styles: 'authoritarian' and 'democratic'.

The main characteristics of the styles were:-

a. Authoritarian style
- All policy is determined by the leader.
- Techniques and steps for attaining the goal are dictated by the leader. Future direction uncertain. The leader dictates the work task and the work companions of each member.
- The leader is 'personal' in his praise and criticism without giving objective reasons.
- The leader remains aloof from group participation except when demonstrating.

b. Democratic style
- Policies are made by group decision.
- Explanations of the over-all process are given at the first meeting.
- When technical advice is needed, the leader suggests several alternatives from which choice may be made.
- Members are free to choose work companions and division of tasks.
- The leader is 'objective' in his or her praise and criticism.
- The leader tries to be a group member in spirit without doing much of the actual work.

Striking differences in the behaviour of the two groups were reported. For example, authoritarian groups tended to be either more aggressive or more apathetic than democratic groups. The aggression was directed more against group members than the leader and, in the apathetic groups, aggressive outbursts could occur when the leader temporarily left the room. Group unity was higher in the democratic groups. The constructiveness of the work decreased when the authoritarian leader was temporarily absent, but dropped only slightly when the democratic leader was absent.

In the authoritarian groups there were more submissive and attention-seeking approaches to the leader, while approaches to the leader in the democratic groups were more friendly and task related.

It is important not to read too much into such experimental situations, but it is nonetheless striking that differences between the two groups were so marked and the impact of leadership style is, as every teacher knows, an important variable in class management.

3. Enquiry versus expository teaching

One of the most fundamental dimensions in considering teaching style as exemplified by method and manner must surely be that between expository teaching and enquiry learning. Exposition is here taken to represent a simple model which assumes the teacher to be the transmitter of information, opinion, fact, and the students to be receivers. The teacher is active and the students are passive in this process. The interaction is largely one way. Enquiry, on the other hand, assumes that the students are engaged in making perceptions, acquiring concepts and developing ideas and skills through their own active participation in the learning process.

Clearly the style of the teacher, in terms of both method and manner must differ considerably according to the approach adopted. The role of the teacher, the planning and the execution of the work are essentially different for exposition as opposed to enquiry.

4. Progressive versus traditional teaching

It has become commonplace to summarise teaching styles as falling somewhere between two extremes. The emotive terms for these extremes are progressive and traditional teaching. The implications are that progressive teaching is forward looking and good. It is probably democratic, enquiry based, open to values considerations, child centred and concerned with problem-solving and decision-making. Traditional teaching, the term implies, on the other hand is often stereotyped as autocratic, didactic, formal, old-fashioned, academic in style and not open to values discussion.

More systematic analysis of the charactristics of progressive and traditional approaches was undertaken by Bennett (1976) in relation to primary schools (5 to 11 age group). Here, the first step was an analysis of the literature concerned with various conceptions of the teaching process. This was complemented by interviews of teachers from twelve schools to find out what they, as practitioners rather than theorists, considered to be the features differentiating progressive and traditional styles.

From this range of sources, Bennett isolated eleven 'basic differentiating elements' as shown in Figure 2.1.

It is interesting to analyse these characteristics in an attempt to clarify a definition of teaching style. In Bennett's terms, teaching style appears to be concerned with:-

a. the organisation of subject matter (integrated or separate subject), that is the basic organisational structure of the curriculum,
b. the role of the teacher, as guide or transmitter,
c. the role of the pupils in learning and curriculum planning,
d. the nature of the motivation encouraged,
e the level of concern with academic standards,
f. the amount and regularity of testing,
g. whether the work is cooperative or competitive,
h whether work is confined to the classroom base or not, and
i. the level of creative expression encouraged.

This simple analysis suggests that teaching style is clearly linked with all the basic elements of a curriculum system. Figure 2.2 presents a simple model of such a system.

Progressive	Traditional
1 Integrated subject matter	1 Separate subject matter
2 Teacher as guide to educational experiences	2 Teacher as distributor of knowledge
3 Active pupil role	3 Passive pupil role
4 Pupils participate in curriculum planning	4 Pupils have no say in curriculum planning
5 Learning predominantly by discovery techniques	5 Accent on memory, practice and rote
6 External rewards and punishments not necessary, i.e. intrinsic motivation	6 External rewards used, e.g. grades, i.e. extrinsic motivation
7 Not too concerned with conventional academic standards	7 Concerned with academic standards
8 Little testing	8 Regular testing
9 Accent on cooperative group work	9 Accent on competition
10 Teaching not confined to classroom base	10 Teaching confined to classroom base
11 Accent on creative expression	11 Little emphasis on creative expression

Figure 2.1 Characteristics of progressive and traditional teachers (Bennett, 1976, 38)

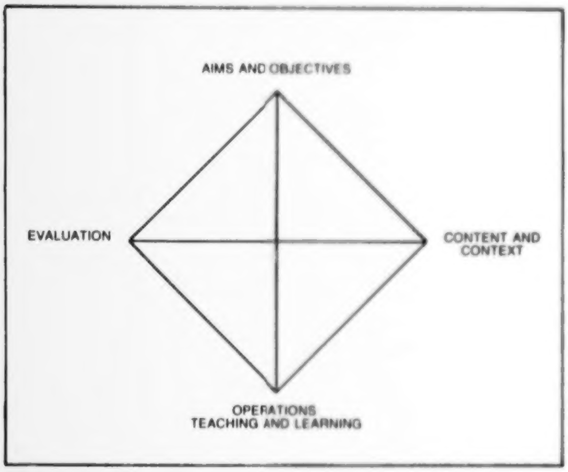


Figure 2.2 A simple curriculum model

Consideration of the list above, derived from Bennett's characterisation of progressive and traditional styles shows that style is concerned with each element of a curriculum system. The relationship between the basic elements of teaching style and the curriculum system are shown in Figure 2.3.

It is an important argument of this section of the book that teaching style and curriculum are closely interrelated, or at least, that they should be.

5. Refining the definition of teaching style

Galton and Simon (1980) offer a definition of teaching style which retains this link with curriculum matters and is attractive in its clarity and simplicity. Teachers, they argue, develop teaching strategies in order to attempt to translate aims into practice. Creating these strategies involves decisions concerning such matters as classroom organisation, management of learning activities and the balance of the curriculum. They then employ tactics, which are the 'minute-by-minute exchanges' between teachers and pupils, through which the strategies are implemented. If these teaching tactics can be shown to be consistent, this can be defined as a teaching style.

Typologies of teaching style

A recent trend in research on teaching styles has been to make statistical attempts to define distinguishable styles, to consider how many teaching styles can be convincingly identified, and how these distinctive styles are characterised.

In the U.K., for example, Bennett (1976) used the analysis of progressive and traditional approaches described above to design a questionnaire on the classroom organisation

Basic considerations in determining teaching style	Elements of Curriculum System			
	Aims and Objectives	Content and Context	Operations: Teaching & Learning	Evaluation
The organisation of subject matter (integrated or separate subject), that is the basic organisational structure of the curriculum.	•	•		
The role of the teacher, as guide or transmitter.	•		•	
The role of the pupils in learning and curriculum planning.	•		•	
The nature of the motivation encouraged.		•	•	
The level of concern with academic standards.				•
The amount of regularity of testing.				•
The nature of the work: cooperative or competitive.		•	•	
The nature of the work: classroom based or not.		•	•	
The level of creative expression encouraged.		•	•	•

Figure 2.3 Basic considerations in determining teacher style (after Bennett, 1976)

and practice of teachers in the primary schools of Lancashire and Cumbria in N.W. England. Questionnaires were sent to 871 schools and the return rate was 88%. Cluster analysis was then used to establish a typology of teaching styles. The analysis was based on the 468 fourth year teachers who responded and twelve teacher types of styles were proposed on the basis of the analysis.

The validity of the classification was tested by observation of 37 teachers whose responses closely matched 7 of the categories of style. The teachers were observed by members of the research team and by local authority advisers. Descriptions of the school day were also obtained from pupils in the form of an essay entitled 'What I did at school yesterday'.

Bennett (1976) ordered the types subjectively, beginning with the most informal, Type 1 and ending with the most formal, Type 12. He warns that it would be an over-simplification to take the ordering to represent a continuum from informal to formal, as Types 2 to 11 all contain both formal and informal elements.

Three examples from the typology are offered here:-

Type 1

These teachers favour integration of subject matter, and, unlike most other groups, allow pupil choice of work, whether undertaken individually or in groups. Most allow pupils choice of seating. Less than half curb movement and talk. Assessment in all its forms - tests, grading, and homework - appears to be discouraged. Intrinsic motivation is favoured.

Type 5

A mixture of separate subject and integrated subject teaching is characteristic of this group. The main teaching mode is pupils working in groups of their own choice on tasks set by the teacher. Teacher talk is lower than average. Control is high with regard to movement but not to talk. Most give tests every week and many give homework regularly. Stars are rarely used, and pupils are taken out of school regularly.

Type 12

This is an extreme group in a number of respects. None favours an integrated approach. Subjects are taught separately by class teaching and individual work. None allows pupils a choice of seating, and every teacher curbs movement and talk. These teachers are above average on all assessment procedures and extrinsic motivation predominates. (Bennett, 1976: 45-47)

A second typology, also concerned with teachers at the primary level is provided by Galton and Simon (1980). This is based on the ORACLE research programme

(Observational Research and Classroom Learning Evaluation, 1975-1980). The research sought to define styles on the basis of observation of actual classroom practice, together with information about classroom organisation and curriculum variables, rather than largely on the basis of teachers' responses to questionnaires.

Four main groups were revealed through cluster analysis:-

Style 1: Individual Monitors (22.4% of sample)

These teachers have the highest level of individual interaction with pupils and the lowest amount of group or class teaching. They concentrate on individuals, yet their teaching is still largely didactic and their questionning factual rather than probing or open-ended. They spend a higher proportion of their time on marking than the other groups.

Style 2: Class Enquirers (15.5% of sample)

These teachers spend much of their time on class teaching combined with individual interaction, but very little time with groups. They use questioning more than the other groups and this is often related to task work. They place more emphasis on ideas and problem-solving than others, but still maintain teacher control through class teaching.

Style 3: Group Instructors (12.1% of sample)

These teachers spend less than one fifth of lesson time in group work, yet this is three times as great as the remainder of the sample. Their teaching is largely didactic, but with a high level of feedback. The main emphasis is on informational activity, although there is some evidence of problem-solving.

Style 4: Style Changers (50% of sample)

These teachers represent a mixture of the other three styles, adopting the characteristics of a specific style when they change to its pattern of organisation. Some change infrequently. Some rotate class organisation at given points during the day, for example when moving to a different curricular area. Some, habitual changers, change in response to pupils' behaviour. Habitual changers make little use of questioning and spend the least time interacting with pupils.

For advocates of group work focussed on enquiry and problem-solving, it is disappointing to note that higher cognitive level questions and statements were used mostly with whole class teaching rather than groups or individuals. The teachers' interactions with individuals or groups were in fact overwhelmingly didactic across all styles.

Factors affecting teaching styles

The reasons for the adoption of a particular teaching style by a particular teacher may be complex and variable. Presumably some factors are well in the control of the teacher. Others may be imposed upon her or him while yet others may be largely subconscious. Work by Dunkin and Biddle (1974) offers the possibility of categorising three sets of variables which may be of importance in influencing teaching style: presage, context and process variables.

Presage variables include the age, sex, social class and culture of the teacher. The teacher's own education and training will provide influences, as will her or his teaching skills, motivation, intellectual capacity and personality.

Context variables include the nature of the pupils; their age, sex, social class, culture, abilities, knowledge and attitudes. The social climate and characteristics of the school may be influential, as will the nature of the class, its size and composition and the availability of resources.

Process variables are concerned with what actually happens in the classroom; the pupils' and teacher's behaviour, the social climate of the classroom, time available and so on.

At a more general level, the nature of the curriculum will probably be a major influence, affecting the aims and objectives of the course as well as of the individual lesson or series of lessons.

Relating teaching styles to student progress

It has been a continuing preoccupation of educational research to attempt to evaluate the impact of differing teaching styles upon the quality of student learning. Reviews of such research reveal its inconclusive and often contradictory nature and it is commonplace for the research to be subject to severe criticism.

As an example of such events we can turn to the well known Bennett study (1976) to which we have already made considerable reference. The traditional approaches in British primary schools remained little changed in the first half of the present century despite the fact that the Hadow Report (1931) had based its ideas broadly on John Dewey's philosophy in encouraging more progressive approaches. A major feature of this move was to be that 'the curriculum is to be thought of in terms of activity and experience rather than knowledge to be acquired and facts to be stored'. (Hadow Report, 1931)

Committed teachers developed progressive approaches over the years, but a significant event was the publication of the Plowden Report (1967) which strongly promoted progressive ideas, received considerable publicity and was influential in the training of teachers at all levels. There is no evidence that Plowden approaches were taken up universally by practising teachers. In Bennett's study, 17% of the sample used the informal approaches recommended by Plowden; 25% used formal approaches, while the majority employed mixed styles based on elements of both formal and informal practice. Nevertheless, the results of the study with regard to the relationship between teaching style and pupil progress received an unusual level of media coverage.

Basically, Bennett reported that in English and mathematics, the pupils taught by formal teachers progressed better than those taught by mixed and informal teachers. In reading, pupils taught by informal teachers were some three to five months behind those taught by formal or mixed teachers. Bennett concluded that formal methods of teaching are associated with greater progress in the basic skills. Pupils in informal classes did not produce better imaginative stories nor show less anxiety than those in formal schools. However, one progressive teacher in the sample showed exceptional progress in the basic skills and this led the researchers to urge caution in reaching simplistic conclusions.

Yet more caution was urged by critics such as Gray and Satterly (1977), who considered Bennett's research design to be flawed and criticised the presentation, interpretation and educational significance of the results, the manner in which the teaching styles were established, the sample selected for intensive study and the statistical procedures by which the data were analysed. These workers considered that no valid conclusion could be reached on the basis of Bennett's published evidence.

This example characterises the nature of the continuing debate. Our concern here is with what geography teachers can learn from all this in order to enhance the quality of their work and of their students' learning.

Geography and teaching styles

Like most teachers, geography educators have long demonstrated interest in the consideration of teaching styles. Stoltman's earlier work for the IGU (1976a) provides a substantial international example of the high level of this interest. A number of contributors applied the Tuckman Student Perception of Teacher Style rating system (SPOTS) to geography teachers and students to provide case studies from the USA (Stoltman), New Zealand (Knight), Cyprus (Dutton), Canada (Choquette), Nigeria (Okunrotifa), Hong Kong (Chu) and the United Kingdom (Slater).

Steinbrink (1976) describes the instruments which can be used in collecting data on classroom environments and teacher behaviours. These include the Flanders System of Interaction Analysis, the Verbal Interaction Category System, the Hill Interaction Matrix, the Tuckman Teacher Feedback System and SPOTS.

Slater (1976), administering SPOTS to 14 - 16 year old pupils studying geography in six schools in the U.K., found that teacher directiveness was strong to moderate. The teachers tightly controlled the activities and learning situations in their classes and rarely used group work. Knight (1976), in New Zealand, felt that geography syllabus statements had a significant effect not only on content, but also on interaction and control. In Cyprus, Dutton (1976) studied eleven secondary teachers, using SPOTS, and found that those working with above average students in geography tended to be more directive than those working with average and below average students. Differences in the classroom style of the teachers seemed to be based on the ability level of the class and the sex and age of the teacher.

In Nigeria, on the other hand, Okunrotifa (1976) in his study of 12 geography teachers in 12 different schools, suggested that the sex of the teacher was not related to the ratings received, but that the sex of the students was related to the ratings of their teachers, the males being the more critical. In Hong Kong, Chu (1976), studying geography teachers in 14 schools, found that the directive mode was dominant, though somewhat less so with male teachers than with female teachers. Chu suggested that teachers with less than six years experience tended to be less directive that those with longer experience, while Okunrotifa found that teachers with less than five years experience were more directive than those with five years or more.

In the U.S.A., Stoltman (1976b) investigated the impact of the High School Geography Project on teacher style and found that teachers using the Project tended to be less directive, although formal preparation for use of HSGP materials was found to change style towards a more directive orientation.

Choquette's (1976) interest in the use of SPOTS as a device for pedagogical self-appraisal is taken up by Stoltman (1976c) where he considers how teachers may be encouraged to change their SPOTS. It should be understood that this research, prepared for discussion at the 23rd Congress of the International Geographical Union, tended to equate directive modes with authoritarian approaches and non-directive with non-authoritarian. Stoltman linked this with the views of Kurt Lewin that "a permissive and self directive environment" tends to "produce the best results for development and learning. Such an environment" facilitates "interaction between pupils and teachers" and promotes "the development of reciprocal and multilateral communications." (Stoltman, 1976c, p. 227).

This interest in teaching styles in geography is taken forward in publications on geography teaching such as Fien, Gerber and Wilson (1984 & 1988) and Manson and Ridd (1977) where one can find advice on a variety of teaching styles ranging from direct expository teaching to open-ended enquiry work. Rawling (1986) calls on teachers to question the way they teach, asking whether they vary their classroom strategies according to the nature of the topic or the characteristics of the pupils. With the introduction of new technology, teachers experiment to try to find the most appropriate teaching styles. Hassell's work (1982, 1983) on teaching styles and microcomputers in geography lessons provides an example of this.

The period of the conceptual revolution in geography was a stimulus for a renewed drive towards more informal styles in geography teaching. This was the period in the nineteen fifties, 'sixties and 'seventies that saw the rapid rise in logical-positivist approaches attempting to develop explanatory and predictive theories and making use of appropriate quantitative techniques to do so. This was accompanied by an increasing interest in attempting to isolate the key organising, or central, concepts in the discipline.

At the same time, developing understanding amongst educators of the significance of conceptual learning helped to put factual learning into perspective. It was appreciated that understanding of principles and concepts was of greater importance for problem-solving and decision-making than role learning of factual information. This echoed the comment in the *Hadow Report* (1931) that the curriculum should be considered in terms of activity and experience rather than by knowledge to be acquired and facts to be stored - a key slogan for progressive education. Active experiential learning is thought to be of the utmost essential in developing conceptual learning and thinking skills.

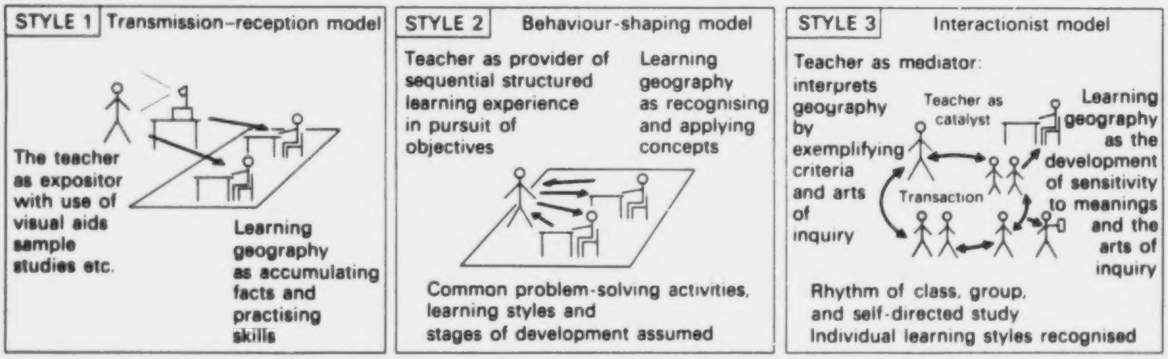

STYLE 1
Transmission-reception model
The teacher as expositor with use of visual aids sample studies etc.
Learning geography as accumulating facts and practising skills
STYLE 2
Behaviour-shaping model
Teacher as provider of sequential structured learning experience in pursuit of objectives
Learning geography as recognising and applying concepts
Common problem-solving activities, learning styles and stages of development assumed
STYLE 3
Interactionist model
Teacher as mediator: interprets geography by exemplifying criteria and arts of inquiry
Teacher as catalyst
Transaction
Learning geography as the development of sensitivity to meanings and the arts of inquiry
Rhythm of class, group, and self-directed study
Individual learning styles recognised

Figure 2.4 Teaching-learning relationships (Tolley & Reynolds, 1977, 27)

With the work of Jerome Bruner and the American High School Project as major stimuli, more informal approaches to geography, such as group work, problem-solving exercises, gaming, role play and simulation were developed. In Britain and elsewhere, active enquiry approaches were seen as a means of developing the knowledge, skills and values of students through the medium of geographical education.

One curriculum project paid specific attention to teaching styles, arguing that pupils' learning experiences vary considerably according to the teaching style adopted (Tolley and Reynolds 1977). Figure 2.4 illustrates three dominant styles and in an earlier publication (Hickman, Reynolds and Tolley 1973) the authors attempted to relate these styles to assumptions about the nature of geography and the role of the geographer; to aims in geography and related forms of assessment and to the planning and management of curriculum change.

Thus Style 1, the transmission-reception model, was linked to regional environmentalism, where the geographer was involved in observation, description and classification, and where generalisations were implied but not tested. Pattern recognition from maps was an important element in the work. Aims of school geography were concerned with factual knowledge of the 'world stage', regions and map and graphic skills. Examination questions commonly tested recall and map interpretation. The curriculum planning and management was characteristically based on programmes of subject matter to be covered and change was initiated through externally determined syllabuses.

Style 3 was, at the time (1973), related to reinterpretation of models in their cultural contexts, acknowledgement of the multi-disciplinary nature of problems examined by geographers and recognition of the significance of values in spatial decision-making. There was a focus on deeper processes such as decision-making, as an aid to the discernment of more subtle patterns. With respect to the aims of school georaphy, Style 3 was linked to courses relating concepts and skills in geography to other areas of experience, practical problems and the clarification of values. There was emphasis on the contribution of geographical studies to students' wider sensibilities. In assessment, there was scope for individual studies, open-ended questions and course work. Curriculum management was enhanced by the provision of criteria for the selection of subject matter and learning experiences. Opportunities for continuity and development were looked for.

This interesting attempt to link teaching styles with the nature of the subject, its educational aims and the planning and management of curriculum change suggests that styles may be influenced by a range of factors and may move in and out of fashion over time. It also suggests that geography teachers should be asking significant questions about their curriculum. These questions are:-

1. What kind of geography is appropriate for the students?
2. What aims and objectives should be shared with the students?
3. What styles of teaching and learning are appropriate for achieving these objectives?
4. What kinds of assessment and evaluation are appropriate?
5. How can we ensure continuing curriculum re-appraisal and development?

All this assumes that an earlier and essential question has been considered: What are the educational needs of the students and how can geography help to fulfil these needs?

This suggests that teachers should be able to vary their teaching style according to the nature of the curriculum: its aims, content, operations and evaluation (see Figure 2.1). They should also be flexible and respond to the nature and demands of the groups they are teaching.

The requirements listed above represent an ideal, since each teacher is limited by the characteristics of her or his own personality, background, education, training and ability. Obviously, it is expecting a great deal of a teacher to be able to meet all these demands and provide the ideal teaching style for all situations. What is needed is more research into teaching styles with specific regard to the teaching of geography. At the very least, for example, more thorough evaluation of enquiry approaches in relation to objectives is required. Further development of teacher education is also needed, in order to develop flexibility of approach so that the limited variations in style of which an individual teacher is capable may be suited to each teaching occasion more effectively.

Case studies and applications

In the papers which follow, authors from a range of different national settings discuss aspects of teaching styles in relation to geographical education.

FRANCES SLATER, from the U.K., explores the nature of individual teaching styles as they are observed in some students in initial training as they develop their skills. She sensitively discusses ideas about the links between personality, strategy and teaching style.

CHI CHUNG LAM, from Hong Kong, provides a case study of a unit on new town development, which is clearly concerned with a value laden issue. He explores the characteristics, rationale and effectiveness of the strategy, or style employed.

JULIE OKPALA, from Nigeria, reports on a survey of teaching styles employed in teaching the reading and interpretation of topographic maps. On the basis of her findings, she calls for changes in teaching style relevant to mapwork which enhance students' understanding of actual landscapes and real-life problems.

KEVIN LAWS, from Australia, discusses a general model of effective instruction developed by Rosenshine and Stevens and shows how the model may be applied to skills in the collection of information and the interpretation of that information in the context of the geography classroom. It is seen as a means of enabling teachers to plan specific guidance to pupils in these matters. Its structured procedures represent a case study of the kind of teaching style which may be appropriate in helping to develop skills.

HENK TRIMP, from the Netherlands, discusses the effect of an innovation, the microcomputer, upon teaching styles. He uses case studies of two lessons to develop ideas about the impact of new technology on three levels of teaching styles: the strategic, the tactical and the operational.

JOHN LIDSTONE, an English geography teacher now working in Australia, considers the range of styles possible in fieldwork and shows, through a description of a field week in North Wales, how different styles may be seen as appropriate to different purposes. The value of variety, sampling from a range of styles, is clearly demonstrated as the cognitive and affective potential of the students is opened up.

MARCOS MUCCIOLO, from Brazil, describes the ways in which political changes in a developing country can influence the styles of teaching adopted by geography teachers, and emphasises the further effects of economic development on the development of geography curricula.

REFERENCES

Ausubel, D.P. (1968) *Educational Psychology: A Cognitive View*, New York, Holt, Rinehart and Winston.

Bennett, N. (1976) *Teaching Styles and Pupil Progress*, London, Open Books.

Choquette, R. (1976) "Use of the SPOTS as a device for pedagogical self appraisal: the experience of a teacher in the Province of Quebec" in Stoltman (Ed.), (1976a), 165-179

Chu, S.K. (1976) "Hong Kong students' perceptions of secondary geography teachers' classroom style" in Stoltman (Ed.) (1976a), 195-209

Dunkin, M.J. and Biddle, B.J. (1974) *The Study of Teaching*, New York, Holt, Rinehart and Winston.

Dutton, R. (1976) "Student perception of teacher style: Cyprus", in Stoltman (Ed.), (1976a), 145-164

Fien, J., Gerber, R. and Wilson, P. (Eds.) (1984 and 1988) *The Geography Teacher's Guide to the Classroom*, Melbourne, The Macmillan Company of Australia. See, for example, Jones, F.G., 'Using expository methods well in geography teaching', and Cox, B., 'Making inquiries work in the geography classroom'.

Flanders, N.A. (1960) *Teacher Influence on Pupil Attitudes and Achievement*, Final Report, Cooperative Research Programme Project No. 397, Minneapolis, University of Minnesota.

Flanders, N.A. (1976) "Research on teaching and improving teacher education", *British Journal of Teacher Education*, 2, 167-174.

Galton, M. and Simon, B. (1980) *Progress and Performance in the Primary Classroom*, London, Routledge and Kegan Paul.

Gray, J. and Satterley, D. (1977) "A chapter of errors: teaching styles and pupil progress in retrospect", *Educational Research*, Vol. 19, No. 1, 45-56.

Hadow Report (1931) *Report of the Consultative Committee on the Primary School*, London, H.M.S.O.

Hassell, D.J. (1982) *Teacher Style and CAL in Geography*, unpublished M.A. dissertation, London, University of London Institute of Education.

Hassell, D.J. (1983) "Teaching style and CAL in geography", in Kent, W.A. (Ed.), *Geography Teaching and the Micro*, York, Longman, 43-46.

Hickman, G., Reynolds, J. and Tolley, H. (1973) *A New Professionalism for a Changing Geography*, Schools Council Geography 14-18 Project, London, Schools Council.

Knight, C. (1976) "Pupils' perceptions of pedagogical processes: New Zealand" in Stoltman (Ed.) (1976a), 127-143

Lippitt, R. and White, R.K. (1958) "An experimental study of leadership and group life", in Maccoby, E.E., Newcomb, T.M. and Hartley, E.L. (Eds.), *Readings in Social Psychology*, New York, Holt.

Manson, G.A. and Ridd, M.K. (Eds.) (1977) *New Perspectives on Geographic Education: Putting Theory into Practice*, Iowa, Kendall/Hunt Publishing Co. See, example, Asmussen, D. and Buggey, J.A., 'Teaching geography through inquiry' and Stoltman, J.P. and Steinbrink, J.E., 'Teaching geography through exposition'.

Okunrotifa, P.O. (1976) "Student perception of teacher style in geography: Nigeria" in Stoltman (Ed.), (1976a), 181-193

Plowden Report (1967) *Children and their Primary Schools*, Report of the Central Advisory Council for Education (England), London, H.M.S.O.

Rawling, E. (1986) "Approaches to teaching and learning" in Boardman, D. (Ed.) *Handbook for Geography Teachers*, Sheffield, The Geographical Association, 56-67.

Slater, F. (1976), "Student perception of teacher style in geography: an exploratory study in London, U.K." in Stoltman (Ed.), (1976a), 115-126

Steinbrink, J. (1976) "Researching instructional styles and classroom environments: a survey of techniques" in Stoltman (Ed.), (1976a), 91-113

Stoltman, J.P. (Ed.) (1976a) *International Research in Geographic Education. Spatial Stages Development in Children and Teacher Classroom Style in Geography*, Kalamazoo, Western Michigan University

Stoltman, J.P. (1976b) "Student perception of teacher style: the effects of the High School Geography Project" in Stoltman (Ed.), 1976a) 211-224

Stoltman, J.P. (1976c) "An international perspective on teacher classroom style research", in Stoltman (Ed.), 1976a), 225-240

Tolley, H. and Reynolds, J.B. (1977) *Geography 14-18: a Handbook for School Based Curriculum Development*, Basingstoke, Macmillan Education

3: TEACHING STYLE? A CASE STUDY OF POST GRADUATE TEACHING STUDENTS OBSERVED

Frances Slater

Recently, I supervised two student/teachers in one geography department at the same school. To watch and observe them teaching was a particular stimulus to thinking about the meaning of the term teaching style. In this case study I shall use observations and recollections of students' teaching and comment on examples of their lesson plans as a way of considering what we may mean by the term.

Is teaching style a matter of personality?

Andrew had that "something" which we refer to as a classroom presence. In fact he had more, a great deal of charisma. He was highly visible in the classroom even when moving around helping individuals or groups. One of his main interests is drama and he was taking the drama option at college. This piece of information helps to convey, I hope, the sense of this student operating in the classroom in a sure-footed and confident manner. He held himself with confidence; looked directly at classes and individuals and spoke clearly and pleasantly in a well modulated and varied way. He displayed a sense of rhythm during his lessons when moving from blackboard to overhead projector or from film strip to worksheet. In doing so, he seemed naturally to emphasize and punctuate these changes in a way which kept interest high and each move in the lesson seemed to contribute to keeping motivation up and refocussing concentration. Andrew had style! He had a sense of his own presence, which stemmed from his personality, personal appearance, personal bearing, personal presence, and personal being. The result was a personal style, Ruth had a different style. In contrast to Andrew's bright pullovers, she was soberly dressed in darker colours, her dark hair even contrasting with his fair hair. She had a quiet, soft voice and did not always look at ease or even comfortable with a class in the early days of teaching practice. Ruth showed a sense of waiting, a sense of not seeing herself in the role of gathering up the reins and directing the class. Perhaps it is fair to say that she seems conscious of the class, of individuals. How she was to approach and meet them was problematic for her. Ruth conveyed something of this in conversation and in seminars as she discussed how she felt about people and about how careful she felt one had to be with people. Her sense of her presence as problematic conveyed her personal approach to people. Where did she stand in relation to them?

Personalities create impressions

I have described two different people; two personalities contrasting in the ways I have picked out. They were not totally unalike, nor have I described them fully. To what extent do we have here the beginnings of a definition of teaching style? We have I think the start of an appreciation of personality in style and the way any of us will bring ourselves or parts of ourselves into a classroom. Sometimes I think that the terms *teaching style* and *teaching personality* could be used synonymously. We might say that just as in the fashion world, style refers to an overall impression created by patternings and colours and shapings of garments, so style in teaching could be used to refer to the overall impression created by the patterning and shape and colour of our personalities. Andrew, we might way, had an "up front", somewhat forceful, leading personality and teaching style, made up of strong colours, definite shapings and clear patternings. Ruth on the other had, was more part of her classroom. Less obviously a leader, she could even be said to play her presence down, and saw herself, I think, more keenly in relation to the class and its individuals. As well as having a sense of her task as teacher she also conveyed a sense of being aware of the children in a way different from Andrew's sense of them. She was less imposing.

These descriptions perhaps begin to read like value judgements. They are not. They convey impressions of personality, observed in classrooms, operating in classrooms, and in fact I am not making comparisons or correlations between personality and teaching effectiveness. We make initial judgements and hunches about which personality may be the most effective (for whom? for what?) but in watching the development of these two students with their classes over three or four months, it was their success in building relationships in different ways which seemed to count most and they were both successful at this. I had then initially an impression of the importance of personality informing style and later a stronger sense of how this and other things went into establishing relationships which work. How very difficult it might prove to be not only to define teaching style fully but perhaps more significantly, to describe the attributes of the successful teacher.

Dimensions of personality

It was particularly stimulating to have, at least on the surface, two such very different personalities in the same school whom I observed within the hour on each visit. I would hesitate to compare all of my students along the single dimensions of presence or charisma (and I am not using those words interchangeably) or 'up-frontness' or leadership or being imposing in terms of their personality. Their personalities were an amalgam of these attributes and others, such as a sensitive hesitance, a sense of finding a place in the class, of answering the question "how do I fit myself in here?" in a non-strongly leading way.

My other students were different again in personality from Andrew and Ruth. Elizabeth had a presence similar to Andrew but did not use it in the same way. Whatever it is I am describing as forcefulness in his personality was not there in the same way in Elizabeth. Mindy was probably closest to Andrew in her way of taking over a class and leading them through. She had some of the same up-frontness. Krystyna, rather close to Ruth in mildness, developed into the giver of some very leading lessons strong in whole class teaching whereas Ruth, on the basis of my observation, went in the direction of adopting strategies which promoted interaction among the pupils. Neil and Julie in their team-teaching used their personalities, created differences in manner and emphasis which makes it very difficult to classify them as having or not having a collective 'presence' since each presence I think differed. It is true that I was more aware of some having strong presences or personalities, but then I cannot label others necessarily as weak since I need words not diametrically opposed to strong to describe their 'presences'. It is often difficult to see how these other presences or personalities are to be described and how they work.

To achieve a whole description of each personality and/or teaching style is very difficult and while a checklist of variables - presence, leadership, finding a place, might appear to fill out a definition, each variable or term then needs to be filled out for its meaning for each individual. A description of Ruth's presence, for example, is so different from Andrew's that one wonders if 'presence' is the appropriate term! It becomes, I think, a different definition of, or concept of presence, the qualities of which are not best seen in relation to Andrew

What match is there between personality and strategy?

I mentioned Krystyna who used a quiet personality to get alongside pupils and who, I observed, was comfortable going around giving individual advice and help, speaking considerately and calmly to pupils even under demanding conditions. As time went on I noticed that she actually developed a strong question and answer technique in teaching on a number of occasions. The alternation of teacher exposition with questions and responses from the class is a well known teaching strategy with the control and unfolding of knowledge residing with the teacher. The lesson plan reproduced here (Figure 3.1) illustrates such a lesson that we might describe as a centrally controlled lesson, the teacher being the central control. I think I can say in Krystyna's case that what she was probably keen to control and achieve was a clear and logical explanation of what information-gathering activities lie behind the construction of a population pyramid. By the time I saw this lesson and similar ones, we were approaching the end of the second teaching practice and it seemed to me that in a non-imposing way Krystyna had built up relationships with some of her classes which allowed her to use a highly directive strategy. This worked to produce a very fine lesson in terms of clarity, understanding, motivated participation and interest from the class, pacing and progression.

Very often when we talk of a question and answer lesson, or a chalk and talk lesson, we tend to think of it as a bit dull and lacking in pupil participation. I think we have to remember that this need not be so, especially where progression to the next idea and the next provides in itself variety and motivation and the chalk part is clearly a way of reinforcing and giving a visual expression to words and ideas. We can note within the lesson plan: the recapitulation element to bring yesterday's ideas into play; then the student activity of brainstorming (though not labelled as such by Krystyna); and the recapitulation and sharing of those ideas which are also written on the board for reinforcement. The question "What doesn't all of this tell us?" is a challenge to think, to problem-solve and brings on-stage the core of the lesson. The next two questions on how to collect and present age and sex data promoted discussion and a number of different responses from several members of the class with all the class appearing interested and 'on task' (It may be that this was the stage which Krystyna could have used brainstorming in pairs to get everyone active). So the questioning led the pupils onward in small steps until age/sex pyramids are developed as a refinement of bar graphs for each age group. The question-and-answer strategy fades at this point and the class, in drawing up the pyramid from figures provided for them, apply their knowledge of graph drawing to their new understanding of the collection and representation of age/sex data.

A non-imposing personality and a strong leading strategy

I have described and interpreted this lesson in one way. It would also be possible to criticise it and make suggestions for more discovery-based methods. My interest in this particular lesson through, and the impact it made on me, stems from the juxtaposition of the teacher's non-imposing personality and the strong leading strategy chosen. One of the links between these two elements is the passage of time and the building of relationships. I would not wish to give the impression that this student used only question and answer strategies; this was not so. One of her earliest units of work used a role play about a piece of waste land and her teaching file has examples of

Aim: To understand how information concerning age and sex structure of a population is collected and displayed.

Objectives:

1 Constructing a population pyramid.
2 Class discussion to interpret the population pyramid.

Steps in Lesson

1 Recap on last lesson

- Why do we measure birth rate and death rate per 1000 of population?
- What to the terms 'life expectancy' and 'infant mortality' mean?
- Reasons why birth rate and deat rate have declined in the U.K..

2 Class writes down the following (in rough):

You are asked to study the population of a particular country or area. List all the things you would be able to tell me about that population based on the work we've already done.

3 Class does No.2 (5-10 mins)

4 Discuss No. 2 and summarise answers on the board. These responses may include:

Birth rate/Death rate of natural increase/decrease; J shaped curves; what stage the population is on the Demographic Transition; past, present and future population trends; linking population growth to food availability.

5 Pose the question: 'What doesn't all of this tell us about the population?'

Summarise student's responses on the board, e.g. age and sex structure.

6 Pose the question: 'If you were responsible for collecting information on how a population is made up (in terms of different sexes/ages) how would you do it?'

Summarise students' responses on the board.

The may include:

1 Sex.

Count number of men and women. Instead of leaving these numbers as whole numbers, write them down as percentages of total population.

2 Age

Divide the population into age groups and count the number of people in each group. Instead of leaving these numbers as whole numbers, write them down as a percentage of total population.

7 Pose the question: 'How can we link up the age and sex information?'

Summarise the students' responses on the board, e.g. count the number of males and females in each age group.

8 Pose the question: 'How could be display the information that we have collected on age and sex?'

The students' responses may include:

- Draw a bar chart with two 'bars' for each age group, one being for males and the other for females.
- Draw two pie charts, one for males and one for females using a different colour for each age group.

9 Hand out worksheet and have the students read through carefully.

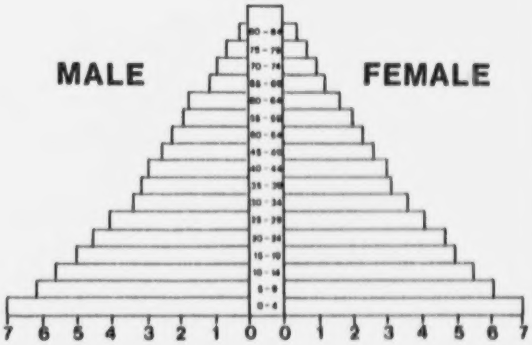
10 Using bar graphs as a starting point, explain how population pyramids are only special bar graphs.

11 Explain how to draw population pyramids.

12 Class draws pyramids using data provided.

WORKSHEET: POPULATION PYRAMIDS

Population Pyramids: show us how the population of a certain country or area is made up. They allow us to see what the Sex Structure and Age Structure of the population is, e.g. how many males there are, how many females their are, and what percentage of the population makes up each of the different age groups.



The above pyramid shows the sex and age structure for England and Wales at some time in the past. Which stage of the Demographic Transition in England and Wales do you think this pyramid shows? (Think what the birth rate and death rate are like).

Figure 3.1 Krystyna's lesson plan on population pyramids.

stimulating student-based sorting strategies or activities and transforming strategies or activities. For example, in work on the tropical rainforest, pupils were asked to sort and transform information as described in Figure 3.2. Perhaps we could conclude very tentatively that this student's personality allowed her to move between strongly leading strategies to strategies firmly based on pupil involvement. Her personality or style was fairly constant, her strategies more varied.

Why do people cut the trees down in a tropical forest?

The sort of farming that occurs in tropical forest is called SHIFTING CULTIVATION.

It is called Shifting Cultivation because the people do not stay and farm in one place forever. They cultivate or farm an area of land for a year or two and then move one.

This is how Shifting Cultivation works:

1 An area of forest is cleared by chopping down the trees and plants and burning them — 'Slash and Burn'. The burning releases all the nutrients (goodness) from the cut plants and trees into the soil.

2 The area is then planted with crops. Often, the only tool used is a 'digging stick'. The stick is used to 'break up' the ground and then make holes in which to put the seeds or plants.

3 The hot wet climate makes the crops grow quickly, and the main task is weeding. The farmer is careful, however, not to harm the shoots of new trees.

4 The crops are harvested as soon as they are ready.

5 After a year or two, the farmer moves on to another area.
This is because the new trees have grown so that it is difficult to plant and harvest crops. The area is left for about 15 years before it is cleared again, as this allows a good 'build-up' of plant foods in the soil.

6 The farmer clears and cultivates another area.

Exercise

Draw a picture for each stage of the 'Shifting Cultivation' way of farming. The farmer is explaining what is happening at every stage. Write this in, and set out like a comic strip.

e.g.

Now I am going to dig over the ground

Figure 3.2 Krystyna's worksheet on farming in tropical forests

Personality and a strategy in combination

It is becoming clear that observation and recollection of students' teaching has first of all focussed on personality as an element of style and indeed I have suggested that the two may be synonymous if we wish to view style as in some senses as indefinable as personality and at the same time as omnipresent and more than the sum of all the parts of a lesson. Yet it is also possible to focus on the methods or strategies which students choose to use and to pick out differences in the combinations of personality and action. Thus we may discern teachers who allow their personalities to dominate the foreground of their lessons. Other teachers may adopt a strong leadership role or direct their classes through integrating their own personalities with the class. We may also find classes in which the teacher integrates his or her personality with individuals or groups for significant periods of time. Thus, it could be the combination of personality and choice of position and action in the class which defines the concept "style". Furthermore, I think that somewhere in all of this is the matter of the teacher's relationship with the class which rests heavily on the teacher's personality and which develops over time with the unfolding of the teacher's personality and actions in the classroom.

Is style a matter of strategy?

From a focus on personality as style, and then personality plus action or strategy in the classroom as style, we can move on to consider strategy or method alone and ask whether this can help us to refine our concept of style related to strategy alone.

Let us look at Andrew's lesson on clouds (See Figure 3). It begins with an excellent video of dramatic cloud photographs, appropriate music but with quite a difficult commentary which is used as a stimulus for a brainstorming activity on how to describe clouds. A number of adjectives are listed on the board and teacher-led activity on classifying clouds by height, colour and shape takes place. When this is completed successfully and in an atmosphere of high interest, the teacher moves to a partially completed overhead transparency. Everyday descriptions of cloud differences are built up by the class with cotton wool clouds mounted on card used to promote ideas and act as a visual stimulus. The class is united by focussing on the cotton wool clouds held up by the teacher and they enjoy giving such words as fluffy and flat. The teacher then moves to the formal terms and explains and relates these in a variety of ways.

As a final application activity the pupils are asked to use a partially completed table to fill in the characteristics of the clouds formally named. As I see this lesson, we have a brainstorming (question and answer) activity which feeds into a sorting and classifying activity bringing more shape and meaning to the initial brainstorm, and finally a "translating" activity whereby children are asked to translate from technical to everyday descriptions, having

1. **Aims**

   1 To look at clouds in terms of how we describe them.

   2 What the different features of clouds are, e.g., shape, colour height.

   3 What 'labels' we use to describe clouds according to those criteria.

   4 Skills —
   (a) Video/visual observation
   (b) Cognitive skills developed as class required to apply general theory to specific examples (decision-making/problem-solving)
   (c) Graphical skills in terms of table construction.

   5 Values — none

2. **Steps in the Lesson**

   Introduction — Talk about last week's homework and hand it back.

   1 Briefly introduce this week's lesson by simply saying it is about how we describe different types of clouds.

   2 Show video which puts different images of clouds, speeded up, to music.

   3 Brainstorm on board — class suggest words to describe clouds,
   e.g. fluffy, flat, white, high, like cotton wool etc.
   Then ring all those which relate to height — class come up with the link (height) — some repeated for shape and colour.

   4 Move to a prepared overhead transparency which is gradually built up from the left, the class providing help where possible — hence the 'technical' terms are introduced.
   (During this session cotton-wool clouds mounted on card are used to stimulate class)

   5 Class activity: copy out OHT table and then copy and complete table on Blackboard.

   6 Summarise briefly using the OHT table.

Figure 3.3 Andrew's lesson on clouds.

had the content presented and built up initially from the everyday to the technical. The whole lesson is very strong in its visual resources and impact with video, blackboard, overhead projector, tables and cotton wool models. I think we could describe the lesson as varied in its strategies and activities, and varied in its style. The content has been clearly organized in advance and this has helped the student teacher to choose different methods of introducing, reinforcing and applying the content at appropriate points in the lesson. The lesson is varied in both activity and resources.

I think we would describe this lesson as teacher-led since the teacher initiates the move from one activity to the next. The pre-planned teacher-input / class-response pattern is there. If we know that Andrew was the teacher, then we probably immediately have a sense that it was a strongly-led lesson, with leading and direction being backed up by visuals and tempered by a consideration of children's responses and language. We might say that a strong personality strongly directed a strongly framed lesson which was organised into a number of interesting and varied episodes. Our concept of style may now include personality (as defined by its presence and leadership qualities) and a sense of the progression and movement of a lesson through the choice of activities, strategies and resources as well as the role given to pupils. If all of these variables and doubtless others gradually come to give us a sense of what we mean by style, then we are using style to encompass many variables rather than defining it in terms of one or two or three. In such a definition of style we may perhaps refer to the cloud lesson as a strong and varied lesson, strong in personality, organisation and leadership and varied in strategy and activity.

Is style a matter of class organisation?

There may be yet other variables to add to our concept of style in teaching and lesson planning. After a brief introduction on the role of water in the landscape and how it is used by people, a first year class was organised into groups of four to examine a number of photographs (See Figure 3.4). The groups were asked to examine the photographs and to complete a table:

Type of Water	Activity	Buildings
e.g. lake	e.g. boating	e.g. jetty, office.

For the next 20-25 minutes the pupils worked at this task. The teacher moved around from group to group. A summarising blackboard exercise then took place during which each group read out its points and the teacher tabulated them. The interest level was high throughout and the pupils seemed to enjoy the task. The teacher then initiated an application activity by presenting of a photograph of an attractive rural lake scene. The challenge to the pupils was to think of all the possible consequences if a leisure/holiday complex were to be built. Both benefits and disadvantages were to be considered. General brainstorming and recording responses on the board were used to explore the likely impact of the complex. The homework continued this theme by asking pupils to choose or think of an unspoilt scene, imagine that plans were being considered to build a big holiday complex, and to write to their Member of Parliament to explain their opinions.

My recollection of this lesson is that the group work gave it a different flavour and atmosphere from the strongly-led lessons I have described above. Ruth had set out an interesting geographical task for the class in which the photographs and the group task were central. It exemplifies a different style of leadership and presence, a different way of interacting with the class and a different form of class organisation. The group organisation would have to feature strongly in a description of its strategy/style along with a description of Ruth's position in the classroom.

Aim

To look at the possible ways in which water can be used for leisure activities and the developments required

Objectives

1. To look at variety of leisure activities using water.
2. To examine the types of water used, e.g. lakes, sea.
3. To look at what man has to do to enable people to enjoy water.
4. To develop the idea of controversy about value of leisure.

Skills

1. Social skills — group work — discussion, evaluation, cooperation.
2. Analysis of photographs — looking beyond immediate to see problems created by activities.
3. Developing value judgements about whether like/dislike a picture and evaluation of benefit if tourism.
4. Drawing up a list — data processing.

Resources

Photographs of people using water from travel brochures.

Lesson Plan

1. Outline aim for today, i.e. to look at how and what people use water for. Put pupils into groups of four — hand out photographs. (5 mins).
2. Give instructions on what group has to do.
   (a) examine photographs
   (b) draw up table —

type of water	what activity	what has had to be built
e.g. lake	boating	jetty, boat hire, office, marina

   (5 mins)
3. Pupils to examine photographs and draw up table. (25 mins)
4. Each group reads out table and main points of each column noted on blackboard. Especially concentrating on what humans had to build. (10 mins)
5. Ask each pupil to choose an unspoilt scene. Give an example of what might happen to an area if a leisure/holiday complex established — e.g. hotel, roads, cafes, sport, shops. Introduce idea that this might spoil an area. Ask why — e.g. rubbish, traffic. Benefits to an area — e.g. jobs, trade. (10 mins)
6. Go through homework. (5 mins)

Homework

Choose an unspoilt scene. Imagine that plans to build a big holiday complex are being considered. Write to your MP saying — (a) if the plan is good or bad, (b) why, (c) effects on area — e.g. beauty, traffic, etc.

Figure 3.4 Ruth's lesson on water

A rather similar lesson took place some three months later with cash cropping and Third World food production as the content focus. A chalk-and-talk introduction to cash cropping took place, linking cash cropping in the UK with that in the Third World. The teacher, Ruth, deliberately angled the discussion to bring out a good picture of cash cropping as a solution to Third World problems. Pupils made notes in their books and then watched part of a video entitled "Man-Made Famine". The video highlighted the problems brought about by cash cropping through commentary, graphics and a village case study. A teacher-led discussion consolidated this work and then with the timing of the lesson much awry the class moved in pairs to complete the worksheet 'dilemma', "It's your decision" (See Figure 3.5). Some difficulties were experienced since the first question really needed to be placed at No. 5 or 6, but here we have another example of a group-based decision-making task extending for a considerable period of time (about 75 minutes). There is a combination here of teacher-led and group-led work which gives a different pattern to problem-solving from the careful, logical development of question to answer problem-solving strategy. It demonstrates that classroom organisation contributes to a concept of style.

I could have chosen many other lessons to examine the links between personality, strategy, activity and style. Role-play features in other lessons I can recollect and of course, these are very pupil-based and decision-oriented. In many lessons, interesting shorter and longer brainstorming sessions occur and teachers fall into the background temporarily. I remember one lesson which moved from teacher-dominance to pupil-dominance in which the class was carefully briefed through the use of overhead projector, documents and teacher commentary on London's housing problem before they were required to work in groups to answer a number of questions. Finally, the classroom was turned into a newsroom and pupils were given the task to prepare a one minute news item. Each group was videoed and their efforts played back to them.

Aim

To examine problems caused by cash cropping.

Objectives

1 What is cash cropping?
2 Why is it a solution to developing World's problems?
3 Pupils to watch video.
4 What problems arise because of cash cropping?
5 Pupils to complete a worksheet.

Skills

- Writing
- Discussion work and communication
- Decision-making
- Watching a video
- Weighing up alternatives
- Understanding of other people's viewpoint

Resources

1 Video — man-made famine.
2 Handout on moral dilemma.

Lesson Plan

Introduction — Outline aim — to show that cash cropping is a good solution to developing World's problems. (5 mins)

1 What is cash cropping? — type of farming, how it was introduced? Where is it found? Crops, instruments, profitability, ownership. Idea that provides labour, food and profit and therefore good. (5 mins)
3 Watch video — give clues about what to watch for —
  (a) advantages and disadvantages
  (b) feeling and opinions. (25 mins)
4 Pupils jot down any disadvantages of cash cropping highlighted in video. (10 mins)
5 Teacher led discussion on disadvantages — main points noted on blackboard. (15 mins)
6 Homework — worksheet. (10 mins)

WORKSHEET ON CASH CROPPING

It's your decision

You are the Chief of Namash Village in Ethiopia. You are at the village meeting to discuss whether the fields should be turned over to the World Sugar Company for sugar production. You are in a difficult position because you have the deciding vote. Which way will you vote.

Side A: The men of the village want to turn the fields over to sugar because they will make more money. They will enjoy spending this on beer and tobacco in the town. As chief you cannot afford to upset the men, you need their support and votes at the next election. You also realise that you too could make a lot of money from growing sugar and you think it would be good for the village to see some new developments as promised by the sugar company. They say they'll build a school and a well.

Side B: The women in the village do not want the fields to be turned over to the World Sugar Company because they know that this will mean that there will be no land left for growing food for the family. There is no money to buy food so the children will go hungry. They also know that they will have to do all the hard work.

As chief you see their point. They will do the work but not get any money. You are also concerned about the children's diet and worried that local traditions will be destroyed when the company moves in. You have heard that in other villages the Chief has lost his power once the sugar company moves in.

Questions

1 Which way will you vote? Why?
2 Do you think the women are right to be worried? What happened in Kenya?
3 What advantages are there in making an agreement to grow sugar?
4 What disadvantages are there?
5 As chief you have to speak to the people. Write your speech. Remember to defend your decision, without upsetting the other side.
6 Imagine you are a young girl. Write a letter to a friend in England describing what life was like before the sugar company moved in and after — e.g. work, money, food, men, look of the village, attitudes, problems, etc.

Figure 3.5 Ruth's lesson on cash cropping

Conclusion

There is such a richness of personalities and ideas which are brought into play when committed students take to the classroom and lesson planning that unravelling the components to detect what is strategy and what personality may seem an academic undertaking. We may view and describe personality in a number of ways. We may classify strategies as teacher centred, group centred, varied, problem-solving or decision-making. We may decide to define style as personality, as strategy, or as some combination of the two, or as something encompassing all these as well as other variables like choice of resources and class organisation. However we approach these tasks, I think an attempt to find meaning in the word style enables us to ponder on our observations and recollections of lessons more keenly and to produce a sharpened awareness of the complicated process which we call teaching.

4: PROBLEMS OF NEW TOWN DEVELOPMENT - USING VALUES IN GEOGRAPHY LESSONS

Chi-chung Lam

This case study is about a unit of work designed for a group of 17-19 year old students who are pursuing the Hong Kong A-level Geography course. The unit is part of a major thematic study on urban problems.

Hong Kong is a rapidly developing city with an extremely high population density. In the highly urbanised area, population density reaches a world record of 100,000 people per square kilometre. As the economy develops, Hong Kong people are making an effort to improve their congested living conditions. The policy of the government is to decentralise people to the less urbanised areas in the New Territories. To avoid haphazard forms of suburbanisation in the New Territories, the government has decided to set up new towns so that people can move into them in an orderly way. However, in some new towns, the working class makes up the bulk of the in-migrants. They face many problems as the provision of physical and social facilities cannot match the increase in demand which goes hand-in-hand with the rapid increase in population. The imbalance in the social structure also invites problems. Tuen Mun is a new town which faces such problems and is the focus for this curriculum unit.

Reasons for choosing such a topic

The most important reason for choosing this topic is that it concerns a value-laden issue. It reflects how people's values affect their choice of home, the role of government in providing a suitable physical and social environment and the competition of the new towns for resoures from the government. Furthermore, as most of the students are living in Tuen Mun and many move in from the old urban areas, they may find that such a local issue is relevant to their daily lives and thus find that their interest is aroused.

The structure of this teaching unit

The approach to teaching this unit may be divided into a number of stages, each of which deals with one geographical question. The major questions are:

1. What are the planning principles of new towns in Hong Kong? Have the planning principles of building 'balanced and self-contained' new towns been fulfilled in the case of Tuen Mun?
2. What problems are created because of the unbalanced social structure of the new town?
3. What types of people move into Tuen Mun? Why are they attracted? Why does Tuen Mun fail to attract other groups of people?
4. What are the possible measures to solve the socially unbalanced situation?
5. What can Tuen Mun residents do to improve the present situation?

The teaching procedure

Abstracts of two articles by Leung, (1983) and Yeh, (1987), on new towns of Hong Kong were given to students, together with a worksheet to guide students in their investigations into the planning principles of new towns. The teacher clarified two of the principles being adopted by the new town planners, namely that new towns should be self-contained and that they should have a socially balanced population. Students were asked whether they thought that Tuen Mun is a balanced and self-contained new town. About five minutes were spent on this brainstorming activity. They were then asked how they could answer this question objectively. The teacher told students that the recently published census data would be useful. As the school library does not have all the necessary reports, the teacher acted as a resource person. He borrowed and photocopied the relevant materials from the university library so that each group of students could get a set of data from which to search for answers and draw conclusions. (The census reports are listed in the references.)

Students were asked to identify the problems in Tuen Mun which are related to the unbalanced social structure. In order to substantiate these problems, they were asked to collect relevant newspaper cuttings.

The teaching and learning activities described above helped students to identify the problems. The emphasis was then shifted to the 'why' question. The unbalanced social structure is created because only certain types of people move into the new town. This was discussed and students were asked to suggest an explanation. Students were asked why only certain groups of people move into Tuen Mun. One lesson was spent in discussing how to gather information to answer the question: 'Why do only certain groups of people move into Tuen Mun?' The students concluded that no secondary data could be found and suggested that they needed to conduct a survey. As they did not have any experience in such an activity, the teacher spent one lesson on the 'scientific route of enquiry' (teaching materials used are taken from Tidswell, 1978), one lesson on how to conduct sampling (teaching materials are taken from Hammond and McCullagh, 1974) and one lesson on questionnaire construction. When they had gained these basic skills the students were divided into groups to discuss these factors which are likely to affect people's choice of home. They put forward a list of hypotheses and these formed the basis for a questionnaire. To make the work easier, a sample questionnaire on residential mobility was given to them so that they could use it as a reference. Each group of students submitted a draft of their questionnaire to the teacher who then made comments and suggestions. Students modified their drafts in the light of the teacher's remarks. Then, each student interviewed five household heads, of whom three should live in Tuen Mun.

Data gathered were analysed by simple statistical methods such as correlation. Two lessons were spent in discussing the findings and the students were led to evaluate the theory they had learned in the previous lesson on residential mobility. They decided that the choice of home was affected by the differential values held by the people. Students also tried to think out what could be done to solve the problems in the light of the findings. Each group presented its suggestions in turn. The teacher raised questions concerning the practicality of their recommendations in order to illuminate the fact that the issue involves conflict of interests among the government, the real estate developers and local residents. For example, one group suggested that the government could provide more and better recreational facilities to attract more people. The teacher raised the following questions: Is the government willing to do it? Why or why not? What will the residents in other new towns say if the government invests a lot of money to improve the condition of this new town only? In this thorough and open discussion, the question of what the Tuen Mun residents could do was also raised. Different views were expressed.

Students were asked to point out the weaknesses and problems they had encountered in the process of questionnaire construction and interviewing. Finally, the students were asked to write a report on their findings as consolidation.

Characteristics of the teaching style adopted

The unit is structured in a way which follows the major questions of 'what', 'how', 'why' and 'what ought'. Although a range of learning activities was used in this unit, the teaching process basically followed an enquiry learning strategy. Students were provided with guidance and various forms of data so that they could delve into the problems. Instead of being told by the teacher, they discovered for themselves the nature of the issue and the reasons for the matter becoming an issue. Thoughout the teaching process, the teacher played the role of either organiser of learning activities, resource person or guide. He avoided being an indoctrinator. The students did most of the thinking.

From the values teaching point of view, students started by clarifying the situation and analysing the origins of this value-laden issue. After this 'objective' cognitive process, they investigated the affective implications. They used the information gained to evaluate the situation critically in order to draw some conclusion about what they could and should do. The teacher did not pass on any values to the students. He just raised an issue and helped students to analyse it objectively and critically. This valuing process moves from the 'cognitive' to the 'affective'; from the 'concrete' to the 'abstract'.

Students were provided with learning experiences so that they could clarify the nature of the issue. This clarification process helped them to realise that the issue was related to the value system of the population. After they understood the issue, they were asked to suggest recommendations to solve the problems. This 'what ought' question led them to enter into the 'values conflict' situation which is fairly common in land use planning. Consequently, they were asked what they could and should do to solve the problems.

Rationale for adopting such a teaching strategy?

The aims of this teaching unit are:

1. to arouse students' concern for the local community,
2. to enable students to identify the complexity of values issues,
3. to enable students to understand how people's values affect their choice of home,
4. to enable students to acquire data gatering and analysing skills which are useful in valuing.

According to Straughan's classification (1982), values teaching strategies can be divided into two broad types: namely form-based and content-based. Advocates of the content-based approach aim at passing on certain 'values', 'attitudes' or 'moral principles' to pupils. Advocates of the form-based approach argue that it is extremely dificult to identify values which should be, or are, worthwhile to be passed on to young people. Furthermore, they contend that it is not desirable to pass on particular values to the pupils as it involves indoctrination. So they suggest that values education should aim at promoting pupils' abilities to analyse values issues. The ability to analyse values is based on both analytical and critical thinking and skills such as data gathering and information processing. The emphasis on ability in analysing value-laden issues does not mean that values education is just a cognitive exercise. All values development should and must involve the affective side.

A form-based values teaching strategy that avoids the danger of indoctrination was adopted in this unit. Students were provided with learning experiences to gather and analyse data, to clarify values issues and to choose their tentative values stance.

One of the reasons why values should be taught in geography is that many geographical phenomena or features are shaped by people's attitudes and values (Buttimer, 1974; Cowie, 1976; Wiegand, 1986). In order to gain a deep understanding of geographical phenomena, it is necessary to teach about values. However, the purpose of teaching values should not be limited to inculcating particular values in the students. Values teaching should be integrated with the understanding and analysis of geographical phenomena or features being studied. The Geography 16-19 Project (Naish et al., 1987) has strongly supported this view and put forward a route for geographical enquiry which incorporates a scientific route of enquiry with values teaching. In this unit, a similar teaching strategy was adopted. The emphasis was on the understanding and analysis of values issues, not on the inculcation of certain values to the students.

Evaluation

Immediately after the unit was finished, six students (out of a total of twenty) were selected and invited to hold a semi-structured group interview with the teacher. The interview was conducted in Cantonese (a dialect of Chinese), the mother tongue of the students and the teacher. At the beginning of the interview, students were a bit nervous as they knew that the interview would be taped. Fortunately, the teacher had established a frank, open-minded and friendly image with the students, so after a few minutes, they settled down and the interview went on very smoothly for one and a half hours.

In general, the aims of this unit were achieved and the students' feedback was positive. Some of the students pointed out that at the beginning they were not really interested in the local issue chosen as they had not thought about the issue before. One even pointed out that it was very boring to study a local issue as she was too familiar with the community. But after they had conducted the survey, they realised that there was a problem. They became more concerned about the situation of the town they are living in. However, they were divided on what they could do to solve the problems. When they were asked whether they were more concerned with their community upon the completion of the unit, one of the students said, "Yes. I know more about the community but I am pessimistic. I can do nothing." However, another student counter-reacted, "No, there is something we can do. I am more optimistic. We can speak out more frequently in order to make other people take our problems seriously. We can also try to know more about Tuen Mun." These comments suggested that choosing a local issue and using it as a case study may arouse students' interest and concern for their community. Encouraging feedback came from a student who is not living in the new town under study. She said, "I think I should conduct a simple survey to study the new town I am living in!" The following comment from a student sums up their feelings, "We have learnt something which is highly relevant to us. Through discussion, especially through the findings of the survey, we can understand the issue better. Now, I know more about our community.".

Another positive outcome was that students developed their skills of enquiry. Below are some students' comments on comparing the teaching strategy adopted in this unit and the usual practice.

"It is better than usual. Normally, the teacher talks and we just sit and listen. But this was not like that. I had to find out the answers myself. It is more interesting."

"I have the same feeling. It is more interesting than writing essays. I like group discussions."

"I have learnt how to solve problems. I know the methods and their limitations. I have learnt to find proofs. In the past I just believed in what the teacher said. But this time, I found out the answer myself. It is very impressive."

This last comment reflects an important element of this teaching strategy. Students do not just follow or believe what the teacher says. They now hold a more critical view towards the 'truth'. They are also more confident in finding answers by themselves as they think that they have learnt the necessary skills. The teacher did not pass on values to the students. Instead, students learned how to discover answers and to think more independently. They liked such a teaching style. They conducted the interviews and discovered the answers rather than receiving the concepts from the teacher. This is extremely important because they have learned to evaluate other people's views critically before accepting them.

When I went into this school to teach this unit, students were fairly passive in answering questions and in participating in group discussion. But after a number of lessons, it seemed that they were becoming accustomed to the enquiry style. They formed groups quickly and cooperation among students in drafting the questionnaire, conducting interviews and discussing solutions was extremely good. When interviewed, students also suggested that their learning atmosphere had improved.

Despite all the positive aspects described above, there are a number of limitations or potential dangers in adopting this teaching strategy. Firstly, it is more time-consuming. As students have to find out the complexity of the values issue by themselves, they have to spend a lot of time on it. Excluding the time spent in preparing the questionnaire, conducting interviews and writing up the report, classroom teaching used up thirteen lessons (forty minutes per lesson). Most teachers would normally only spend five to six lessons on this topic.

In adopting this teaching strategy, the role of the teacher is to lead students to think and illuminate the issue. However, there is a potential danger in that the teacher may give too much guidance. This may pose an undesirably strong influence on the students' line of thought. One student said, "Your (the teacher's) influence on us is very strong. We follow your way of thinking. If I am not careful, I shall follow all your line of thought." Of course, being a teacher, it is necessary to provide guidelines to students to go through the enquiry process, but the teacher must take care not to pass on his or her values unintentionally to the students.

Conclusion

The teaching strategy adopted in this unit worked well. The aims of arousing students' interest in and concern about their local community and developing their awareness of various values were fulfilled. The strategy integrated with the learning of geographical concepts well and avoided the danger of indoctrination. Though it requires more teaching time, this strategy is more effective than expository teaching for achieving the aim as set out earlier.

REFERENCES

Buttimer, A. *Values in Geography*, 1974, Commission on College Geography Resource Paper No. 24, Association of American Geographers.

Census and Statistics Dept., Hong Kong Government, 1987, *Hong Kong 1986 By-census: District Board Constituency Area Summary Tables*, Hong Kong Govt., Hong Kong.

Census and Statistics Dept. (1986), *Hong Kong 1986 By-census: Summary Results*, Hong Kong Govt., Hong Kong.

Census and Statistics Dept. (1986), *Hong Kong 1986 By-census: Tertiary Planning Unit, Population by Age*, Hong Kong Govt., Hong Kong.

Cowie, P.M. (1978) "Geography: a value-laden subject in education" in *Geographical Education*, 3, 133-146.

Hammond, R. & McCullagh, P.S. (1973) *Quantitative Techniques in Geography: An Introduction*, Oxford Univ. Press, Oxford.

Leung, W.T. (1983) "The New Town Programme" in T.N. Chiu & C.L. So (ed.) *A Geography of Hong Kong*, Oxford Univ. Pess, Hong Kong.

Naish, M.C., Rawling, E. and Hart, C. (1987) Geography 16-19. *The Contribution of a Curriculum Project to 16-19 Education*, Harlow, Longman.

Straughan, R. (1982) *Can we teach children to be good?*, George Allen & Unwin.

Tidswell, V. (1978) *Pattern & Process in Human Geography*, Univ. Tutorial Press.

Wiegand, P. (1986) "Values in Geographical Education" in Tomlinson, P. & Quinton, M. (ed.), *Values Across the Curriculum*, Falmer, Lewes.

Yeh, G.O. (1987) "New Towns and Their Development" in Hong Kong in *The Geography Bulletin*, Education Dept., Hong Kong.

5: TEACHING STYLES IN READING AND INTERPRETING TOPOGRAPHICAL MAPS - THE NIGERIAN EXPERIENCE

Julie Okpala

The reading and interpretation of topographical maps constitutes a compulsory question in the school certificate geography examination in Nigeria. This question demands that students demonstrate an ability to:

1. identify topographical features and heights;
2. perform calculations related to scale, distance, gradient and cross section;
3. write descriptions of the distribution and patterns of physical features, communications, population and settlement, and the relationship between these phenomena.
   (West African Examinations Council (WAEC), 1984, NERC, July, 1985)

In Nigeria, authors of textbooks on mapwork, geography students, teachers and examiners of school certificate geography agree that mapwork is the area of greatest difficulty for students. (Ndu 1973;Okonkwo, 1977; Nimako, 1969, 1982; WAEC, 1975, 1977, 1978, 1980, 1981, 1984)

Studies which have examined students' attitudes to mapwork, physical geography and regional geography have shown that mapwork presents the greatest difficulty. (Ndu, 1973; Okonkwo, 1977)

Authors of textbooks on mapwork for West African School Certificate Examinations in geography recognise that mapwork poses problems to students. For example, Nimako commented in the introduction to his text book: "Map Reading for West Africa" (1969), that students feel despondent where mapwork is concerned and in the revised edition (1982), he stressed that he attempted to help students to attain mastery and understanding of mapwork by grading the content and giving more samples of model examination questions and answers based on his experience as a WAEC examiner.

West African School Certificate geography chief examiners' reports (WAEC 1975-1984) show that students' performance in mapwork is generally poor:

> "This compulsory question was poorly handled. It appeared most candidates did not have enough practice at map reading. They could not locate features in 1 (a) nor could they calculate gradient. Many of them did not even know the simple formula for calculating gradient. The general conclusion is that candidates need more practice at map reading before being presented for the examination." (WAEC, 1978: 16)

> "The standard of the question on physical geography (Paper 18) shows some constancy in recent years. Conversely there has been a down - ward trend in the performances ... There was a general display of poor knowledge of mapwork as compared with other sections of geography." (WAEC, 1981)

> "This question being a compulsory one was attempted by all candidates. But performance in it was generally poor because most candidates could not reduce the map correctly using the new scale. They also made inaccurate insertions of the features named. Many of them equated angular bearing with compass direction." (WAEC, 1984: 93).

Nigerian students are not the only ones to experience problems in mapwork. Boardman (1983) commented on reports made by examiners in mapwork for Certificate of Secondary Education and General Certificate of Education Boards in the U.K. Like the WAEC, these boards demanded reading and interpretation of Ordnance Survey maps. Boardman (1983) quoted the following examples from the reports on the 1980 examinations:

> "Many candidates are still unable to interpret simple contour patterns" (West Midland Board).

> "Large numbers of candidates are not learning basic map skills and very few read contours" (London Board).

He also reported that although questions on relief and drainage had been set for several years many candidates were still unable to give clear descriptions of the area represented on the map. He quoted the JMB (1978) as reporting that:

> "Many candidates failed to recognise flat summits and ridge features, dissected by deep, narrow, steep sided, winding dry valleys, but switched on to escarpments and sought dip and scarp slopes all over the area."

The same report revealed that there was a quite alarming number of candidates who stated that rivers flow into the area from the sea. As a solution to students' poor ability to interpret survey maps, Boardman (1983) emphasised the need for adopting improved teaching approaches to facilitate their understanding of concepts in mapwork.

Statement of the problem

It has been established that mapwork is a problem area for students and there have been calls for improvement of the teaching and learning situation. A major beginning towards this change is investigating how mapwork is actually taught in schools. This study therefore investigates the teaching styles involved in teaching mapwork in secondary schools in Nigeria.

Research questions

The study attempts to answer the following questions:

1. What are the organisational approaches adopted in mapwork lessons?
2. What are the teaching procedures adopted in mapwork lessons?
3. What are the frequencies of units of thought processes involved in verbal interaction in mapwork lessons?

Hypotheses

In order to make a decision on the thinking processes involved in verbal interaction in mapwork lessons the following hypotheses were formulated:

1. There will be no significant difference between the proportions of units of categories of thought processes involved in verbal interaction in mapwork lessons.
2. There will be no significant difference between the proportions of categories of thought process involved by teachers and students.

The need for the study

As already noted, there have been calls by examining bodies and individuals for improvement in teaching of mapwork in schools as a means to improving performance in the area in school certificate examinations (WAEC, 1975-1984; Boardman 1983). Suggestions made are based on normative information and assumptions. Few attempts have been made in the past to observe the teaching-learning process which is the most central element in education. However lofty an educational objective may be, the classroom situation determines whether or not it is achieved. The present study is important as it involves observation of teaching mapwork lessons. The results obtained provide the basis for suggestions for improving the teaching of mapwork in schools.

Subjects

Mapwork lessons taught by eight geography teachers from eight Nigerian schools over a period of six weeks were observed. The eight teachers involved in the study all possessed the basic qualification needed for teaching in Nigerian secondary schools. This is The National Certificate in Education and higher qualifications.

Instrument

An open design approach was used. Thirty mapwork lessons were observed with the author as a non-participant observer. The author familiarised herself with the classes involved for two weeks before the observation. A verbatim record of all that was said in the class was made through audio and video devices. Details of the non-verbal interactions in the classroom were recorded. The type of classroom organisation (whole class, group or individual approach) was also recorded.

Data analysis

The teaching procedure was analysed with regard to the activities performed by the teacher and the students within the teaching period. The instructional materials used in the lesson were also noted.

The quality of teacher - pupil interaction was ascertained by analysing teacher and pupil utterances using the Aschner - Gallagher System for Classifying Thought Processes in the context of classroom verbal interaction (Aschner and Gallagher, 1965). The rationale for adopting this system, which emphasises quality of interaction, is that mere utterance does not indicate that learning is taking place. This system not only defines the types of thought processes to be identified in verbal performance but also embraces and accounts for the great variety of associated typical behaviour both verbal and non-verbal that characterises routine classroom operation. It contains five categories (with sub-categories) four of which represent an adaptation of Guilford's (1959) model of operations of the intellect. These operations consist of Cognitive Memory, and Convergent, Evaluative and Divergent thinking. The fifth category is Routine. This includes routine procedural matters, though they need not necessarily be completely devoid of content. The utterances made were divided up into segments representing units of thought. Each segment was then subsumed into a sub-category of thought processes.

The reliability of coding in this system was ascertained by involving a second coder in a 58 minute transcript with 389 units of interaction. The index of Inter-coder Agreement (Scott, 1955: 323) was .95.

The thought processes were finally reported under the headings of Routine, Cognitive Memory and Productive Thinking. Productive Thinking stands for the three higher thinking categories of the Aschner - Gallagher system.

The concept is similar to Saljo's (1975) deep level processing in contrast to surface level processing. Surface level processing is synonymous with Cognitive Memory. This, though not devoid of thought, is concerned with requoting, reviewing, repeating, clarifying factual statements and monologues and therefore cannot facilitate effective conceptualization and learning. Frequencies of the units of thought were obtained.

The hypotheses were tested using the Z.-test for differences between proportions (Obikeze, 1986).

Hypothesis 1 Ho: Pu = Ps = .3333

Where Pu is the population proportion and Ps the sample proportions.

Significance Level =/< .95; two tailed test.

Hypothesis 2 Ho: Pu = Ps = .0500

Significance Level P =/< .95; one tailed test.

Results

1. Organisational Pattern.

In the thirty lessons observed the basic organisational pattern was classwork in which teachers taught the classes as a whole and presented questions for students to answer. Such questions were either answered individually in writing, orally by volunteers, or in chorus.

2. Teaching Procedures

Eight teaching styles were observed:

1) Teaching New Topic

2) Review of Previous work
   Teaching New Topic
   Reviewing Past WAEC Questions on the Topic

3) Teaching New Topic
   Working exercises of the WAEC Question type

4) Introducing New Topic
   Working examples from past WAEC geography questions

5) Teaching New Topic
   Practice
   Home exercises

6) Test on Take-home Assignment given at the end of the previous lesson
   Review of the assignment and correction
   Take home assignment on the topic for the next lesson

7) Eliciting information on new topic through questioning
   Summary on the topic for students to copy

8) Writing WAEC Past mapwork questions and answers on the chalkboard for students to copy

No one teacher used a single approach. The frequencies of the approaches used by the eight teachers in thirty lessons in serial numbers 1 to 6 are 12, 2, 3, 3, 1, 1, respectively. Explanations are made below of some of the terms used in the teaching procedures.

The following teaching styles are described below:

a) Review of work,
b) Teaching New Topic,
c) Assignment, and
d) Drilling on past examination questions.

a) Review of Previous Work

Review of previous work involved asked students questions on previous lessons. An example of revision on mensuration and scale is given below:

The teacher wrote the following on the chalkboard for students to work:

Metres 10mm = 1 cm
cm 100 cm = 1 m
km 100,000 cm = 1 km

12 inches = 1 foot
3 ft. = 1 yard
63360 inches = 1 mile

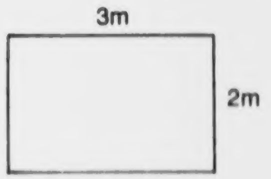


Figure 5.1

What will the length and width of the area shown be if the scale of the area is :
1 cm to 100 cm?
1 cm to 1 m?

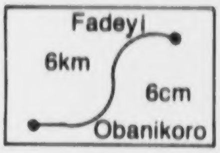


Figure 5.2

Distance on the map = 6 cm
Distance on the ground = 6 km
What is the scale?

3. Express 1/100,000 as a statement of scale.

4. If distance on the map is 9 cm and distance on the ground is 4500 m. What is the scale?

5. Express 2"/2 miles as a representative fraction. (Okpala 1987).

In this lesson the students copied as teacher wrote. The students then worked the problems individually. The teacher went round and marked individual work. Finally, the class worked the problem items together.

b) Teaching New Topic

The teaching of new topics generally followed the pattern:

Definition --- Explanation --- Examples

An example of a lesson on contour farms is given below:

Definition. Teacher: "A contour is a line joining places of equal height."

Explanation. Teacher: "Assuming that this is a hill (starts drawing) you have the height indicated for every 100 feet. This is the sea level which is zero. You have an interval, a vertical interval of 100 feet. So this is 100, 200."

Teacher and Students: "300, 400, 500, 600, 700, 800."

Teacher: "Which is at the top or summit?"

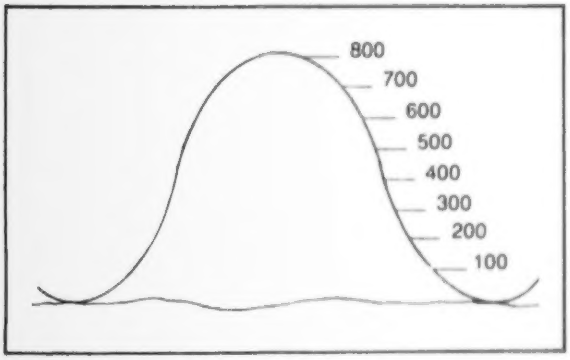


Figure 5.3

Now if you want to draw a map of this hill, it should be something like this.
(Teacher draws)

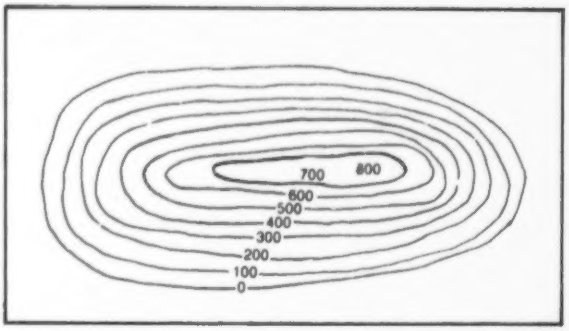


Figure 5.4

He then fills in the numbers with the students all counting "0, 100, 200, 300, 400, 500, 600, 700, 800". Contour forms for features such as spur, valley, pass, col, knoll, ridge, watershed are then introduced through sketches. Examples are shown below:

Teacher: "A valley and a spur both have similar shape V. The only difference is that a spur is actually a V-shape while a valley is an inverted V. In numbering, you notice that spurs have lower numbers at the apex while for valleys, it is the opposite" (starts numbering). The diagram produced is shown below -

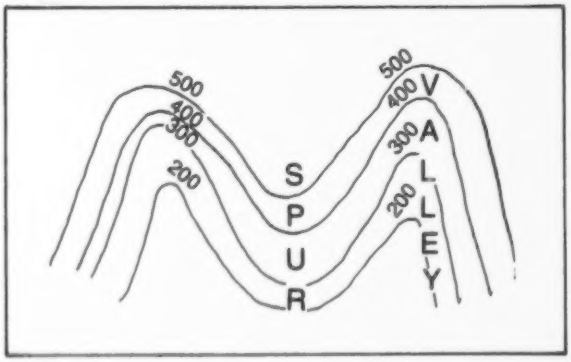


Figure 5.5

The students copy as teacher writes -

Teacher: "Another difference between a valley and a spur is that quite often rivers pass through valleys, through the inverted V shape. Where there is no river this is called a dry .... ".

Students: "Valley"

Teacher: "This is a valley, a spur and a valley." (numbers and fills in the names, students copy)
"Now there is a river in this valley but there is none in this pointing. Therefore this is a dry .... ".

Students: "Valley"

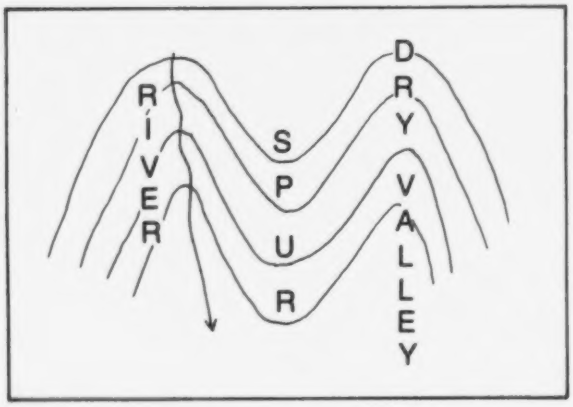


Figure 5.6

Teacher: "Now look at the topographical map on the board. Find spurs and valleys".

The teacher called on students to identify either a valley or a spur. When a student did not identify the feature correctly, the teacher emphasised how to recognise the feature as indicated below (Okpala 1987):

Teacher: "Now this one, look up. The apex is facing down. Isn't it?"
Students: "Yes"
Teacher: "What is it?"
Students: "A spur"
Teacher: "The other one somebody showed me, now the, V - the apex is right?"
Students: "Yes"
Students: "What about this one? Is it facing down?"
Teacher: "No when the lines are facing up, well I want you to show me the V down now here. Not only one but a group of lines."
Student: "There, Ma."
Teacher: "No, that one is going up. It is a valley. See (sketching) it should be like this."

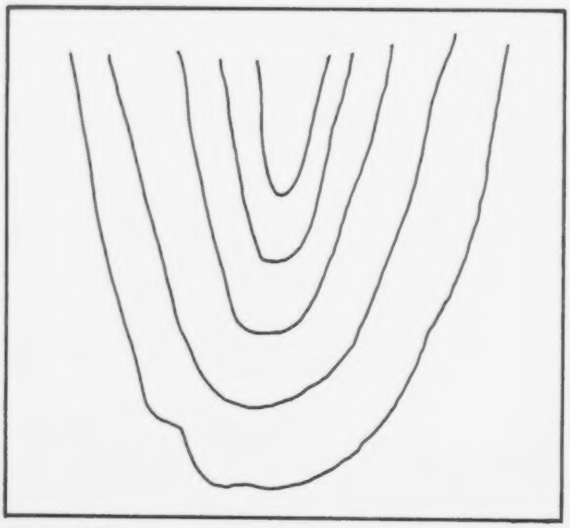


Figure 5.7

Student: "Here like this (pointing)."
Teacher: "Yes, good."
Student: "This?"
Teacher: "Yes, good."

c) The Assignment Method

Teachers adopting this style did not teach new concepts but rather, at the end of each lesson, gave students a section of the textbook together with questions to study on the topic for the next lesson. An example of this approach to teaching the representation of relief is given below.

At the end of one lesson, the students were assigned the following task:

Read Chapters 6 and 7 of "Map Reading" by Nimako and make notes on the following:-

i) Methods of representing relief.
ii) Draw contour forms of conical hills, saddle, spur, valley, gorge, watershed.

The teacher started the next lesson by writing the following questions based on the assignment on the blackboard for students to answer:

Question.

i) List 6 methods of representing relief on a map.
ii) Draw contour lines showing conical peak, saddle, spur, valley gorge, ridge, watershed.

The teacher went round and marked students' work and corrected wrong sketches. The students then tried to identify the features on topographical maps. The lesson ended with an assignment on the topic for the next period.

d) Drilling based on past examination questions

Drilling of students on school certificate questions took two forms

i) The teacher taught the topic and then read out past school certificate questions on the topic. The students then worked out the answers either as a whole class or as individuals.

ii) The teacher wrote out past examination questions, or similar questions and the model answers for the students to copy.

An example of the second type is shown below.

Question:
What advantages common to Odumasi, Konongo and Juaso have helped them to become the largest settlements in this area?

Answer:
Odumasi, Konongo and Juaso are situated in major valleys with the main lines of communication these provide.

Each is on a spur where there is slightly higher ground near the river, offering protection from floods, but has proximity to a water supply for the town.

All of these towns are situated very near the main road where it is joined by a minor road and also on the railway. The conventional signs on the map show that each town has a market, a post office, a rest house, a church and stranger's quarters for people from other tribes.

All these features indicate that each of the towns is an important focal point for the surrounding area. (Okpala, 1987).

The emphasis laid on examinations and review of examination questions necessitated investigating how much time was spent on this in mapwork lessons. It was found that 511 of 1082 minutes (47%) of the total time was spent on drilling on past examination or examination types of questions.

Thinking process involved in classroom verbal interaction

Analysis of data collected on the thinking processes which were involved in classroom verbal interaction during mapwork lessons revealed that the proportions of the different categories of thought processes were Cognitive Memory, .3888; Routine, .3674 and Productive Thinking, .2438. This pattern nevertheless is not constant for individual teachers. In order to make a decision on the occurrence of the categories of thought processes in mapwork lessons the hypotheses were tested.

To test Hypothesis 1 which states that there will be no significant difference between the proportions of the different categories of thought processes in mapwork lessons, the Z tests of the proportions of the different categories of thought processes were calculated. The Z - values are generally significant for all categories of thought processes. For Routine and Cognitive Memory, the Z - values were positive while for Productive Thinking it was negative for each individual teacher except one. The hypothesis of no significant difference between the proportions of the categories of thinking processes is therefore rejected.

Hypothesis 2 states that there will be no significant difference between the poportions of categories of thought process employed by teachers and students. Analysis reveals that, with minor exceptions, all Z - values were significant. Accordingly, the hypothesis of no difference is rejected beyond the .05 confidence level. The full results and analysis are presented in Okpala (1987).

Discussion and educational implications

The results of this study show that teaching of mapwork in the selected classrooms was teacher oriented. Most teaching was organized on a whole class basis. Teaching styles were dominated by lecturing and drilling based on past and typical examination questions. The thinking processes of classroom verbal interaction were dominated by routine classroom activities and memorization. Productive thinking was significantly under-emphasized. Verbal interaction in the classroom was dominated by teacher talk.

The observed organisational patterns of mapwork lessons fall within the Transmission - Reception and Behaviour Shaping Models of Tolley and Reynolds (1977) and were shown diagrammatically as Figure 2.4 in the paper by Naish (this volume).

These organisational patterns are conventional and traditional. The conventional approach to education is characterized by an emphasis on structure initiation - a high degree of direction and control on the part of the teacher. Lindgren (1976) in discussing the deficiencies and strengths of conventional methods stressed that while some measures of direction and control are necessary in learning, the regimentation found in many traditional classrooms has few counterparts in adult life. Classwork which is characterised by the assumption that children learn best by copying the reality that is presented to them (Elkind, Hetzel and Cole, 1974) does not encourage the development of self-direction, initiative, spontaneity and creativity which are necessary for every day living. Such a situation does not facilitate learning as it does not encourage active participation by students.

The teaching procedures used in the mapwork lessons observed greatly stressed the regurgitation of facts and drilling for answering school certificate examination questions. There was no practical demonstration in order to help students to understand the concepts. Mapwork which is based on reality was taught in a theoretical way.

Board (1967), Ratajsky (1978) and Keates (1982) emphasize that reality is the source of map information. Keates, writing on the "reality" in maps, stresses that a map is not just a tool but is a part of a communication system within a transmitter, channel and receiver model shown in Figure 5.8 below.

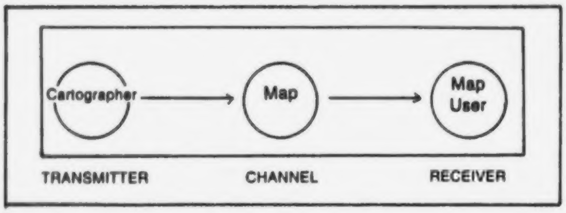


Figure 5.8: The Basic Concept of Some Theories of Cartographic Communication.

He insists that maps will be better used and understood if their fundamental structure and purpose is realised. He explains that the transmitter, who is the cartographer, produces a map when a need is perceived. The need for the map could arise for example, from a user who may engage a survey company to obtain information for the production of a base map. After the information is obtained, the cartographer then constructs the map in its final form. Maps, including topographical maps, result from a need and depict reality. Topographical maps would be better perceived by students if the fundamental structure of maps became the basis for teaching. The teaching of mapwork in schools frequently ignores reality and needs which are the basis for cartographic communication. It could be argued that the negative attitudes and poor performances observed in school certificate geography examinations result from students' failure to appreciate the meaning of maps due to the overly theoretical approach adopted in their geography lessons.

Information collected in this study shows that about half the total time was spent on drilling on examination questions. Teachers cannot be blamed for emphasizing skills in answering examination questions because in any examination - oriented educational system such as in Nigeria, what matters to any teacher is that his or her students perform well in the external examination. Educationists (Macintosh, 1970; Morris, 1972; Marsden, 1976; Lewy, 1977) are agreed that, however lofty a curriculum prescription may be, the requirements of external examinations determine both what is taught and how it is taught in schools.

Questions on mapwork in school certificate examinations which ignore and negate the fundamentals of cartographic communication cannot motivate effective teaching and learning. Examples of these questions include:

Calculate the gradient along the River Werram from its sharp bend (elevation approximately 3439') to its confluence with the River Gimi (WAEC, 1979).

Calculate the actual distance in kilometres as the crow flies from Mayo Selbe Rest House to the trigonometrical station at Kwenta (Walu) (WAEC, 1982).

Although the questions above were set on the West African School Certificate syllabus which will cease to operate from 1988, the requirements of the new curriculum which was introduced in 1985 and which rationalised its basic framework as conceptual learning and problem-solving still maintain the *status quo*. A sample question for the 1988 Secondary School Certificate Examination provides evidence in support of this assertion:-

State the height of the highest point on the map.
Calculate the distance along the minor road from Ukpe junction to Ekpemi.
(WAEC Test Development and Research Division, August 1986).

Since only reality is meaningful, and learning is best motivated by need, it could be argued that questions on mapwork such as those above cannot induce teachers to make use of pupil- and reality-oriented approaches in order to enhance effective conceptualization in mapwork. During mapwork lessons students were not given the opportunity for deep level processing which is the crux of critical thinking and preparation for effective living in society.

Conclusion

There is a dire need for a change in teaching strategies involved in mapwork lessons from the talk - chalk theoretical approach to an involvement of students in practical work, group work, inquiry learning, games and simulations. These approaches would make mapwork lessons stimulating and meaningful to learners and teachers as well as encourage active participation by students. While a change of strategies or style is recommended, it should be noted that such a change will not happen until the present pattern of questioning in mapwork is changed. There is a need to structure questions in mapwork which reflect the fundamental nature of cartographic information. Such questions should reflect reality and needs. Rather than mere theoretical questions to be answered, questions should be based on issues and problems relevant to the students' environments. In answering such questions, students could exhibit their knowledge of mapping concepts by their use of relevant ideas, principles and prior knowledge in solving the problems.

REFERENCES

Aschner, M.J. and Gallagher, J.J. (1965) "Aschner - Gallagher System for Classifying Thought Processes in the Content of Classroom Verbal Interaction" in Anita, S. and Boyer, G.E. (eds.) *Mirrors for Behaviour: An Anthology of Classroom Observation Instruments.* Michigan: Research for Better Schools Inc.

Board, C. (1967) "Maps as Models in Chorley", R.J. and Hagget, P. *Models in Geography.* London, Methuen.

Boardman, D. (1983) *Graphicacy and Geography Teaching* Kent, Croom Helm.

Elkind, D. Hetzel, D., and Cole, J. (1974) "Piaget and British Primary Education", *Educational Psychologist* 11, 1-10.

Guilford, J.P. (1959) "Three Faces of Intellect" *American Psychologist* 8, 469-479.

Keates, J.S. (1982) *Understanding Maps,* Harlow, U.K., Longman.

Lewy, A. ed (1977) *Handbook for Curriculum Education,* Paris, UNESCO and Longman.

Lindgren, H.C. (1976) *Educational Psychology in the Classroom* 5th ed., New York: John Wiley.

Macintosh, H.G. (1970) "A Constructive role for Examination Boards in Curriculum Development", *Journal of Curriculum Studies,* 2, 32-39.

Marsden, W.E. (1976) *Evaluating the Geography Curriculum,* New York, Oliver and Boyd.

Morris, B. (1972) "Examinations as Instruments of Education Reform in Morris", B. ed. *Objectives and Perspectives in Education,* London. Routledge and Kegan Paul.

Ndu, A.N. (1973) *Attitude to Geography,* Unpublished B.Sc. Dissertation Nsukka, Department of Education, University of Nigeria, Nsukka.

Nerc (July 1985) *National Curriculum on Geography for the Senior Secondary School,* Lagos, Nigerian Educational Research Council.

Nimako, D.A. (1969) *Map Reading for West Africa* Harlow, U.K., Longman.

Nimako, D.A. (1982) *Map Reading for West Africa,* Revised Edition with Metric Examples, Harlow, U.K., Longman.

Obikeze, D.S. (1986) *Introductory Statistics for the Social Science*, Enugu, Fourth Dimension Publishing Co. Ltd.

Okonkwo, L.O. (1977) *Major Areas of Students' Difficulty in Secondary School Geography*, Unpublished B.Sc. Dissertation. Nsukka, Department of Education, University of Nigeria.

Okpala, J.I.N. (1987) *The Feasibility of Reality Oriented Problem-Solving, Questions in WAEC Examinations as a means to Improving the Teaching and Learning of Mapwork in Nigerian Secondary Schools'* Ph.D. Thesis, London, University of London, Institute of Education.

Ratajski, L. (1978) "The main characteristics of cartographic communication as part of theoretical cartography", *International Year of Cartography*, xviii.

Saljo, R. (1975) *Qualitative Differences in Learning as a Function of the Learner's Conception of Task, The TIPS Project 19*, Gothenburg, ACTA Universitatis Gothoburgensis.

Scott, W.A. (1955) "Reliability of Content Analysis: The Case of Nominal Coding", *Public Opinion Quarterly*, 19, 321-325.

WAEC - (1975) *West African Examinations Council School Certificate and G.C.E. Geography 1B 257/2 Nov. S.C./G.C.E. 1975*, Lagos, WAEC.

WAEC (1975, 1977, 1978, 1980, 1981, 1984) *Chief Examiners' and Moderators' Reports*, Lagos, WAEC.

WAEC (1982) *West African Examinations Council School Certificate and G.C.E. Geography 1B 251/2 June S.C./G.C.E. 1982*, Lagos, WAEC.

WAEC (1984) *"Geography O Level Mapwork Syllabus"* The West African Examinations Council School Certificate and General Certificate of Education (Ordinary Level) and for the General Certificate Education (Advanced Level), Lagos, Academy Press Ltd.

WAEC Test development and Research Division (August 1986) *Specimen Questions for Senior Secondary School Certificate Examination Paper II General Geography*, Lagos, WAEC.

6: AN APPROACH TO TEACHING DATA COLLECTING AND PROCESSING SKILLS IN GEOGRAPHY

Kevin Laws

Students are required to learn as part of their school life, specific information based upon various bodies of knowledge and to master special skills. Often the information to be learned is unfamiliar, and frequently it is difficult for the students to understand. However, some of this information can be organised in a hierarchical manner, and some skills can be taught in a step-by-step fashion. In such cases it may be appropriate to use a teaching style based upon instructional procedures which Rosenshine and Stevens (1986) have called a general model of effective instruction. In this paper the model will be applied to those skills in collecting information and interpreting that information which are commonly used by students in geography classrooms. No attempt will be made to organise specific geographical information into a hierarchial structure to illustrate the model as the range of material taught in geography is too broad for a specific example to be of use. However, it is hoped that teachers will be able to apply the model to such information for themselves.

In learning geography, students are expected to be able to collect data from a wide range of sources and to process this data into usable information. However, in many classrooms specific guidance in the processes of data collection and processing is haphazard, or students are provided with information which has already been processed into the form to be learned by a textbook writer or by the teacher. The use of the "general model of effective instruction" provides a sound basis for teachers who would like to offer their students specific guidance in data collection and data processing or analysis.

A general model of effective instruction

In developing the model Rosenshine and Stevens identified six fundamental instructional functions derived from a number of experimental studies across a range of subject areas and grade levels. The results of these studies indicated that the use of the functions could lead to increased achievement and student involvement in classroom activities. Although the research relating to the use of this approach in the learning of geography is very limited it appears that the model has applicability to certain aspects of data collection and data processing (Figure 6.1.)

DATA COLLECTION

Reading Skills

- Comprehension
- Understanding Vocabulary
- Defining the purpose of text

Study Skills

- Finding information
- Recording information

DATA PROCESSING

- Classifying
- Interpreting
- Analysing
- Synthesising

Figure 6.1 Some areas in which the general model of Rosenshine and Stevens (1986) may be used.

The six functions may be enlarged, contracted or revised according to the attributes of the class and the material. Emphasis may be placed on one or a number of the functions at a particular stage of learning (Figure 6.2).

1. Reviewing prior learning
2. Presenting new content/skills
3. Providing guided practice
4. Providing feedback
5. Providing individual practice
6. Periodic reviewing

Figure 6.2 The six stages of effective instruction

1. Daily reviews and checking previous learning

Opportunities should be provided at the start of a lesson for students to recall, practice and overlearn previously learned information and skills. This is especially important when the material or skills to be introduced in the lesson are building upon previous learning. Techniques for daily reviews and the checking of previous learning include:

- teacher questions about concepts and skills
- a short quiz
- the reviewing and correcting of homework
- students prepare oral or written summary of previous lesson
- students prepare questions on previous lesson or homework which they ask the teacher or other students.

The primary purpose of the review is to provide the teacher with information about those aspects with which students experience difficulties, and give students the opportunity to clarify and practice previous learning.

2. Presentation of material to be learned.

How can new material be organised so that it can be learned most effectively? What are the characteristics of an effective demonstration/presentation? How many and what kind of examples should a teacher use? How much information should be presented at one time? Which is the most effective way of sequencing the material to be learned? These are key questions often asked by teachers. Unfortunately, there is little conclusive evidence to help but it seems that the following generalisations may be applicable:

- teachers should tell students the goals of the lesson
- teachers should provide step-by-step demonstrations of the new material
- teachers should use numerous and varied examples to illustrate the material
- teachers should check to see all students understand one step before proceding to the next.

The style of presentation is of major importance in effective instruction. Rosenshine and Stevens (1986) provide the following advice:

a) Goals and main points

i. State the goals of the presentation
ii. Focus on one step at a time
iii. Avoid digressions
iv. Avoid ambiguity of expression

b) Step-by-step presentation

i. Present material in small steps
ii. Organise present material so that one point is mastered before the next point is introduced
iii. Give explicit, step-by-step directions
iv. Provide an outline of the sequence of complex material before beginning the demonstration or explanation.

c) Procedures

i. Model the skills or process for the students
ii. Give detailed explanations of difficult points and repeat these explanations a number of times in a variety of ways
iii. Provide students with concrete and varied examples.

d) Check for understanding

i. Monitor student understanding by asking questions or asking students to summarise the main points in their own words
ii. Ensure that students understand one part before going on to the next one
iii. Reteach those parts which are causing difficulties through further explanation or peer teaching.

The writer suggests that it is the lack of clear, structured explanation together with concrete examples and close monitoring which often accounts for the difficulties that students experience. Effective presentation as described above would take very little extra time and would add significantly to students' learning.

3. Guided student practice.

In addition to a carefully planned presentation Rosenshine and Stevens suggest that it is essential that students be given the opportunity to practice, under guidance, the information and skills they are learning. The key is frequent, successful practice. Teachers should prepare a large number of questions on the main points, supplementary points and the processes involved which can be asked in order to check the students' understanding. Students need to be able to practice their responses under the guidance of the teacher or other students, and this can be done either orally or in writing. The students should also be encouraged either to summarise the main points of the presentation individually or in small groups and to check their summaries against one provided by the teacher.

Just as the presentation is broken into small steps, so is the practice, with mastery of one step being achieved before progression to the next. Explicit demonstrations of skills should be provided by the teacher whenever possible. When learning unfamiliar material or skills, students' attention should be drawn to those aspects which are more difficult to master. A greater amount of time should be allocated to these aspects.

4. Feedback and corrections.

The way in which a teacher provides feedback and correction depends upon the way in which the students responded in the first instance. Rosenshine and Stevens suggest the following procedure:

(a) Correct, quick and firm student responses should immediately be acknowledged and questioning should continue.

(b) Correct, but hesitant, responses, such as might be expected to occur during the initial stages of learning, should be received with immediate short statements of feedback, and possibly with a re-explanation of the steps needed to arrive at the correct answer.

(c) Incorrect, or seemingly careless, responses should simply be corrected before proceeding to the next question.

(d) Incorrect responses, due to a lack of knowledge of the facts or the process can be handled through the use of prompts, hints or supplementary questions which can lead the students to the correct answer. Sometimes it may be necessary to re-teach the material to those students who do not understand it.

5. Independent practice.

After guided practice students should be provided with further practice opportunities. This usually occurs through seatwork, although there are times when additional teacher-led practice or student cooperation practice can be used to advantage.

Rosenshine and Stevens recommend that a routine be established so that students know what they have to do (achieved through teacher statements, directions on worksheets or the board), how they can get help without interrupting the class (e.g. raising their hands), and what they should do once the assigned task has been completed. Clear instructions and explanations, and adequate guided practice will help make seatwork efficient and effective. The teacher should circulate during seatwork, actively explaining, observing, questioning and providing feedback through brief contacts with individual students. With very difficult material, a lesson should be broken into a number of sequences of presentation, guided practice and independent practice, with each sequence dealing with a single element.

6. Periodic reviews.

From time to time, e.g. weekly, monthly and especially before learning new material based upon prior learning, reviews should be carried out. This can be done through informal questioning, quizzes and tests. Such reviews provide a check on the pace of instruction and the retention of information, and ensure that previously acquired skills have been adequately learned and can be recalled when necessary.

Some applications of the models

In the following sections a number of examples are provided to illustrate how the model may be applied to the skills of data collection and data processing. In each instance the importance of breaking each task into its basic components is emphasised.

1. Using appropriate sources.

The effective teacher of geography provides students with the opportunity to work with a wide range of information sources such as books, magazines, journals, newspapers, directories, encyclopedias, videos, slides and computers. Explanation and demonstration as to how each source may be used to provide information, and practice and feedback in using each, must form part of instruction. The utility of each source, the kind of information each provides, and the special ways in which each is structured, are essential knowledge for effective use.

a) Collecting Data from Textual Sources.

If textual sources are used to provide data, students will need instruction and practice in the following skills essential for critical and analytical reading:

- extracting the literal meaning
- using chapter and section headings
- identifying keywords, topic sentences and summary sections
- differences between main and subordinate ideas
- distinguishing between fact and opinion
- using various parts of the book (table of contents, index)
- recognising author bias
- recognising the limitations of the data

Students need to be taught that specific reading skills are appropriate in particular situations. In some instances it will be necessary to skim the text in order to get an overall picture. In this instance the ability to identify topic sentences and summary sections is important. Skimming may be an appropriate technique to use when the students' task is to prepare a summary of the data or a topic outline or to identify an author's line of argument.

Summarising is also a skill that needs to be taught. When students are required to search a passage for answers to specific questions a scanning technique may be used. This may involve the identification of key words and their synonyms and the ability to realise that a number of pieces of information are necessary to answer the question adequately. The ability to identify cross references is also important in this process.

b) Collecting Data from Tables, Graphs and Diagrams.

It is important that students realise that there is no single 'best' way of presenting data, and that the same information may be presented in a variety of forms. They must try to determine why the person or group which produced the data decided to present it in a particular way. It is necessary to realise that clarity of presentation may not be the key reason behind the choice of a particular form. Sometimes choices are made because of the need for emphasis of a special feature or to hide something that may confuse the issue. Some general guidelines when extracting information from tables, graphs and diagrams are:

- Read the title carefully to discover the purpose of the graphic
- Identify the source of the data. Is it likely to be reliable?
- Check the units of measurement being used. Large numbers may not be written in full. (Check both axes of a graph.)
- Use a straight line when reading values from a graph and only try to read one value at a time.

A useful independent practice activity associated with the collection of date from tables, graphs and diagrams is to set students the task of constructing a graph using a different scale or of transforming the data into some other form. Possible transformations would include asking students to change:

- numbers into graphics
- graphics into numbers
- words into graphics
- graphics into words
- words into numbers etc.

2. Processing data.

The collection of data as outlined in the previous section is only one part of the whole learning process. Students need to be provided with opportunities to process data so as to make sense of it for themselves. Data processing in this sense is closely linked with the development of intellectual and thinking skills. In this concluding section a number of basic data processing skills will be analysed in order to identify the component processes which may be taught to students. The skills are classifying, interpreting, analysing and synthesising.

a) Classifying can involve the following:

- Identifying relevant factual information.
- Understanding the relationship between items of factual information.
- Grouping data into categories according to appropriate criteria.
- Placing data in a sequence, either in order of importance or order of occurrence.
- Transforming data into other forms e.g. tables, charts, graphs.

(Based on NCSS, 1984)

Teachers who wish to undertake specific instructions with the aim of developing students' skills in classifying data may find the technique developed by Taba (1967) to be useful. Taba suggested that students should begin the process by enumerating and listing data, and then go on to group the data by identifying common properties. Finally these groups should be categorised and labelled.

b) Interpreting can involve the following:

- Stating relationships between categories of information.
- Noting cause and effect relationships.
- Drawing inferences from factual material.
- Predicting likely outcomes based on factual information.
- Recognising instances in which more than one interpretation of factual material is valid.

(Based on NCSS, 1984)

Interpreting in this context means discovering relationships or explaining the meaning of something that is not explicitly stated. Cartoons, graphs and tables, pictorial and written materials can all provide opportunities to develop students' skills of interpretation. Taba (1967) suggested that the following sequence of questions could guide students' integration:

- What did you note? See? Find? (Differentiation).
- Why did so-and-so happen? (Explaining relationships, recognising limitations of data, relating points to each other).
- What does this mean? What would you conclude? (going beyond what is given, making inferences and generalisations).

c) Analysing here means the breaking up of a whole into its constituent parts. At a simple level it may involve listing the elements occurring in a written passage. At a higher level it requires the identification of relationships between elements of even the organising principles behind the information or phenomena.

Students need to be given practice in the following in order to develop skills in analysis:

- Recognising underlying assumptions.
- Following a line of argument.
- Identifying an author's point of view.
- Identify relationships.
- Drawing conclusions.

d) Synthesising involves students in combining elements to form a whole or to reveal a pattern or structure. It is the opposite of analysis. The process involves logical deduction and creativity because the "new whole" is the result of original thinking on the part of the learner.

NCSS (1984) suggested that the following skills could be involved:

- Proposing a new plan of operation.
- Creating a new system.
- Reinterpreting events in terms of what might have happened.
- Visually presenting (Charts, graphs, diagrams, etc.) of information extracted from print.
- Communicating orally and in writing.

Conclusion

This paper suggests that teachers can promote effective learning by planning opportunities for students to participate in activities which require them to process data for themselves. The "general model of effective instruction" will help teachers to structure the materials and prepare the activities for their students.

REFERENCES

N.C.S.S. (1984) "Essential Skills for Social Studies", *Social Education,* April, 260-261.

Rosenshine, B. and Stevens, R. (1986) "Teaching Functions" in *Handbook of Research on Teaching (3rd edition),* M.C. Wittock, New York, MacMillan.

Taba, H. (1967) "Implementing Thinking as an Objective" in *Social Studies in Effective Thinking in the Social Studies,* J. Fair and F. Shaftel, Washington.

7: TEACHING STYLES AND COMPUTER ASSISTED LEARNING IN GEOGRAPHY

Henk Trimp

In the Netherlands, it is often an indication that you have found your place as a teacher, when you are allotted your own classroom: a room that you can furnish according to your own wishes, where the atlases can be found on the same shelf as you left them, where the wallmaps hang on exactly the right rails in front of the blackboard and where the soil profiles are fastened to the wall in an aesthetically pleasing manner.

By the time this stage has been reached, the teachers have usually settled down in other areas as well. They have chosen a textbook series, with which they can work quite nicely, have made supplementary materials such as stencils and tests, and have also found their own manner of getting along with the students. In brief, a teaching style, related to each teacher's personality, has been developed.

Why, then, does such a hectic atmosphere so often prevail during the school breaks, when teachers may be seen running around with piles of material and dragging complicated equipment through the hallways, not even finding the time to drink a cup of coffee in peace? This atmosphere not only prevails amongst the young teachers who have been given a different classroom for every class. It also affects experienced teachers as yet another wave of renewal spreads through the education system. In the most negative case, the atmosphere may be attributed to governmental intervention, resulting in schools having to merge with each other or reduce the staff. This tends to disrupt everyday school life, because teachers have to move their things to other buildings. In other cases, it has to do with educational innovation, e.g. a sudden emphasis on field research which suddenly demands that a large part of education must take place outside the school building.

In this contribution, I will consider the effects of the rise of a new educational appliance, the microcomputer, which, during the last few years (1985-1988), has been brought into Dutch schools by the 'truckload'.

In order to aid systematic discussion, teaching style has been considered at three levels: the strategic level, the tactical level and the operational level. The influences of school managements and public authorities will only receive marginal consideration.

In addition to the three levels listed above, a distinction is also made between the provision of computers in a special computer room and their provision on trolleys which are either already situated in the geography classroom or which can be rolled in when needed.

For each of the above-mentioned situations a case study will be described in which the implications for the various levels of teaching styles will be reviewed. In this manner, an attempt will be made to fill the cells of the matrix illustrated in Figure 7.1.

	COMPUTER ASSISTED GEOGRAPHY TEACHING In	
TEACHING STYLE LEVEL	Geography Room	Computer Room
strategic		
tactical		
operational		

Figure 7.1 Teaching style and CAL in geography

Levels of teaching styles

The strategic level includes the decisions teachers make in regard to the curriculum, varying from establishing the contents of a series of lessons about a certain topic to planning their work for a whole year or a series of years. At this level, teachers will often have to consult colleagues and co-ordinate their work with the curricular plans laid down by public authorities, but they may also place their own personal stamp on the decisions to be made.

The tactical level concerns itself with the structure of one lesson; time planning, production of extra material, setting up equipment and also deciding whether to adopt whole class or group methods of classroom organisation; in short, all the things which some teachers have already done far in advance, but which others only start worrying about ten minutes before the lesson begins.

The operational level takes place on the 'shop-floor' and involves the teacher's behaviour in respect to that of the students, adapting to unexpected incidents and the way in which the material for lessons is handled.

It goes without saying that the various levels are not detached from one another. Decisions made at strategic and tactical levels affect the actual actions in the classroom (top-down) and, vice versa, the everyday experiences, in time, influence strategic decisions (bottom-up). The predominant direction of relationships between the levels determines, for a large part, the teaching style. The extremes are represented by the 'stopwatch planner' on the one hand, and the 'free-wheeler' on the other. Planners start recording their own and their students actions (top-down) at home in their studies by means of a precise statement of educational goals. Such an approach can still be seen to be reflected in the lesson planning forms used at some of the teacher training centres, in which the columns 'What the teacher does' and 'What the student does' have to be filled in minute by minute. The freewheelers will wait and see upon arriving in the classroom what they and their students really need, and then act accordingly. Upon being confronted with annoying inspectors, who ask for lesson and curriculum plans, they formulate their plans in such a way as to permit their open approach to education (bottom-up).

The computer in the classroom or the class in the computer room

The most customary path for new equipment arriving in a school is to follow in a straight line to a computer room. This room, very often a former classroom, is often already fitted with special electric facilities and alarm systems and the computers are arranged in a U-shape along the walls. In large rooms, another arrangement of desks is often placed in the middle, which makes whole class teaching possible. With the new MS-DOS equipment, lent to schools for secondary education as part of the NIVO project (See van Beckum and Trimp, 1986), it is actually obligatory to set up the majority of the computers in a safeguarded computer room. Of the eleven available computers, nine are placed in a network there and thereby often replace the smaller equipment which was previously purchased, such as the Commodore 64, the Apple II and the BBC-B. The remaining two computers are especially intended to be used in subject-oriented education and may therefore be mobile. In many schools, however, even these two machines still end up in the computer room.

The consequence of this situation is that geography teachers, who want to employ CAL, are largely dependent upon the computer room. This means that both the teacher and the students have to take all the materials they may need (e.g. wall maps, books, atlases) to this room. The room must be reserved in advance and particularly in the case of network usage, the system manager, who gets the needed equipment and hardware ready, also must be consulted in advance.

For teaching situations in which the computer is used for only part of the lesson, or in which only a limited number of students are to make use of the computer while the rest of the students are busy with other activities, the geography classroom is often the most suitable place for work. The materials needed are there and the computers do not have such a dominating influence. Moreover, the teacher can adjust the arrangement in the classroom to meet the requirements of the groupings and working methods which have been chosen.

In Dutch geography classes, so-called 'whole class teaching' with the computer (Wiegand, 1984) has hardly made an appearance. Although the majority of geography classes are taught in a whole-class style, teachers who start using the computer frequently switch to a more individualised form of learning. Therefore, the form of computer application which interferes the least as far as teaching style is concerned (that in which micro is used as a supplement to familiar equipment such as slide projectors and overhead projectors) will not be considered any further. For reports regarding 'classroom-based teacher-conducted action research' (Kent, 1986: 156), one must consult British publications (Kent, 1984; Hassel, 1982, 1983).

This literature suggests that the most common form of student grouping is that of two or three students per computer. This is partly due to the concentration of computers in the computer room whereby the hardware configuration does not allow for the formation of larger groups since there is just not enough seating room per computer while alternatively, there are not enough computers to permit individual usage (8 to 15 computers per class of between 20 and 30 students).

Very often students also work in small groups when using computers in the (geography) classroom. Here, however, a differentiation in teaching tasks often occurs: Part of the class works with a certain computer program and the rest occupies itself with non-computer activities, either related to the same subject or on a completely different topic.

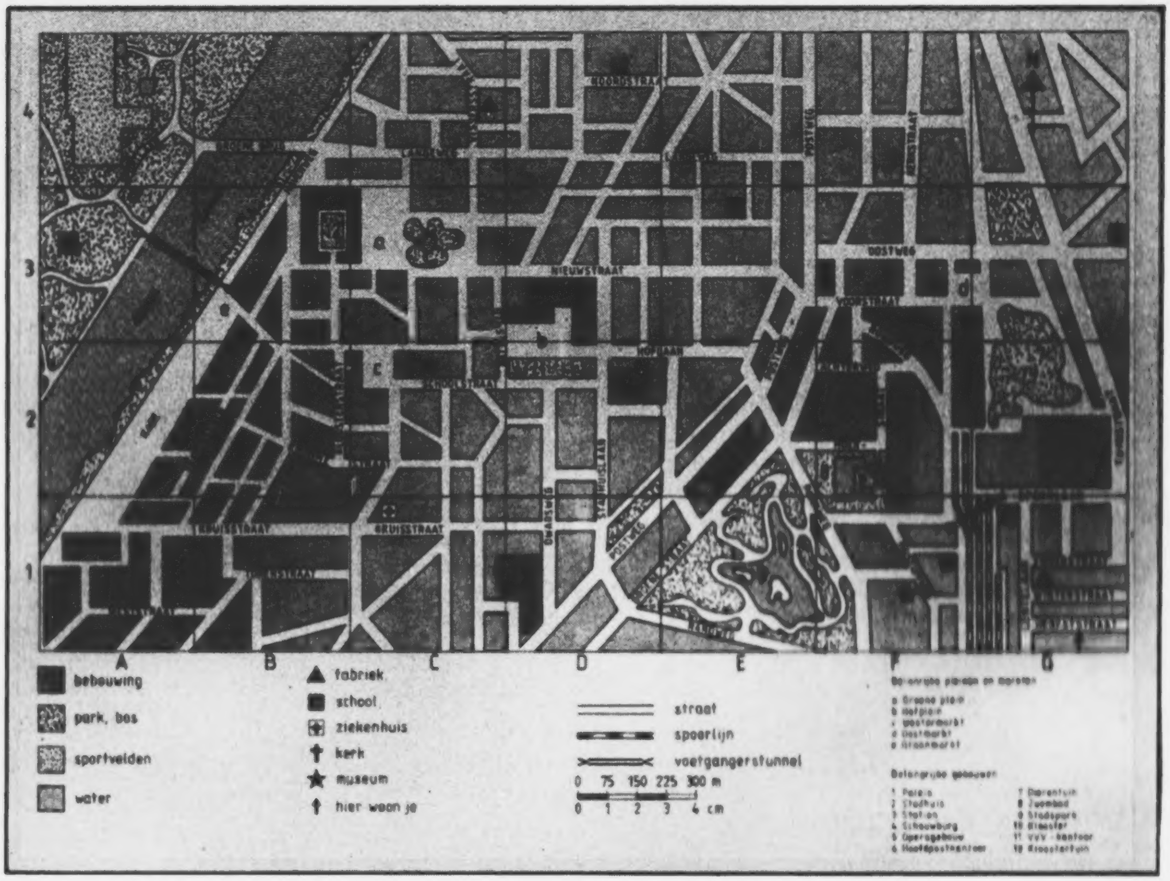


Figure 7.2 The street plan of "Op Weg Naar het Feest".

Case studies

The studies presented here both concern the application of a computer program dealing with map usage. Case study A concerns a primary school in which groups of pupils eight to ten years of age worked with the program 'Op weg naar het feest' ('On your Way to the Party' Hoek, 1985).

Case Study B deals with the application of the program RALLY (Hoek and Trimp, 1987) in the first form of secondary education. The ages of the students ranged from 12 to 14 years.

The lessons described have been completely recorded on video and in Situation B, dialogues between students have been recorded on audio tapes as well. Furthermore, interviews have been conducted with teachers and students.

1. Op weg naar het feest

a) Description

i) Contents of the Program

In 'Op weg naar het feest' the pupils are asked to find their way to the home of a girl who is celebrating her birthday, using a streetplan (See Figure 7.2). The program gives instructions on the route to be followed and asks questions about the journey. The questions can be answered by studying the plan paying particular attention to compass-orientation, map symbols and the map legend. The questions are divided into three levels. The starting level can be determined by the program on the basis of a pre-test or it can be fixed by the teacher. If the pupil makes too many mistakes in traversing the route, the program automatically switches to a lower level while the pupil can always ask the computer for help when answering the questions.

ii) Preparation

The teacher arranged six microcomputers to be used in his own classroom by a group of 30 pupils. Three types of activities were planned: Working with the computer program, working on a similar assignment using maps, and a drawing assignment, which has new technology as its theme. The duration of the course was divided into four phases (See Figure 7.3).

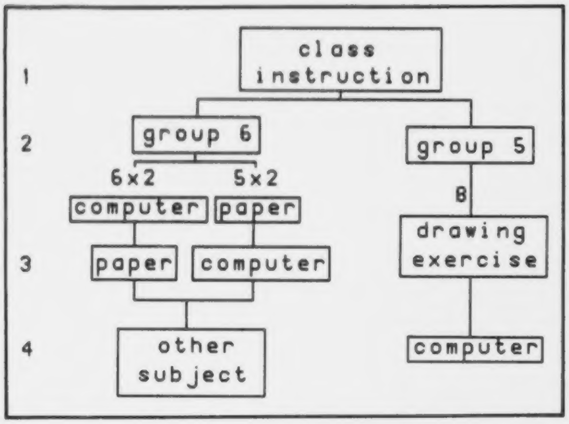


Figure 7.3 The organization of the lessons

Phase 1: Introduction by the teacher.

Phase 2: 12 pupils from Group 6 (10 years of age) worked in pairs on the computer, the remainder worked on the map assignment on paper while eight pupils from Group 5 (9 years of age) worked on the drawing assignment. The students were paired according to ability with an able student helping one who is less able.

Phase 3: The pupils from Group 6 changed tasks and the pupils from Group 5 continued with their drawing assignment.

Phase 4: Group 5 worked with the program under the guidance of an assistant teacher on one computer. Group 6 in the meantime, moved on to assignments on another topic.

In order to carry out the various activities, the following preparations were made: A program (cassette) was available for each computer, a map was available for every pair of pupils, the map assignments were put on paper and a special handout to explain the special keys on the computer was written. In addition to this, the teacher also prepared an oral introduction.

Immediately before the class began, tables, chairs and computers were set up (See Figure 7.4). The materials for Phase 2 were laid out. During previous lessons, the subject of map use had already been covered as well as a few operational aspects regarding the use of the computer (Hoek, 1987).

iii) The Lesson

In the introduction, the teacher reviewed some essentials of map reading using the blackboard as a visual aid. He then walked from table to table, giving instructions, resolving differences of opinion, but mainly observing the pupils. He watched and listened to see how the pupils reacted to the program. Working in pairs provoked heated discussion. The help provided (from the help option in the program or from the teacher) was often subjected to a thorough analysis, before a new decision was made. What was striking was the growing willingness of the 'natural leader' of each pair to allow the other to make his or her own mistakes applying the motto: 'Well, go ahead. You'll see what happens!' In the drawings from Group 5, the computer played an important role, as can be seen in the example in Figure 7.5.

The teacher played the role of organiser in the transition to a new phase. He supervised the termination of the activities, the collection and distribution of material, the relocation of pupils and the restarting of programs.

b) Analysis

This example illustrates the teacher's flexibility in classroom organisation at the tactical level. At the strategic level, however, no dramatic changes occurred. There was, however, a wish to do 'something with computers' with the dual purpose of exploring the potential of microcomputers in geographical education, and also of allowing the pupils to become acquainted with new technology and achieve some computer literacy. To reach these goals with CAL requires an open attitude towards the curriculum and the will to experiment. Such a relatively minor change at the strategic level makes possible significant changes at the other two levels. Even though the content of the lessons about the use of maps may remain more or less the same, the organisation may change drastically. A longer period of preparation, a more thorough reflection on the division into groups and a tighter time schedule are needed. This results in some loss of freedom. While pupils in primary education are often allowed to decide their work strategies for themselves, such decisions may become governed by the technical constraints associated with the computers.

Finally, the teaching style in the class (at the operational level) is influenced by the unexpected. The teacher becomes an observer of a confrontation between his pupils and the world, which lies outside the classroom. What they come across often cannot be foretold by the teacher, even after thorough preparation. The only thing he can do (and must do) is to observe them accurately and guide them when needed. Unfamiliarity with the equipment can form a barrier at this point because of the attention which technical problems can demand. Good technical preparation will ensure that the adventure lies more in the field of geography than in the cables and function keys.

2. Rally

a) Description

i) Contents of the program

Rally is a learning game, in which the student traverses a route which is made up of three trajectories. Only the start and the finish, as well as the two intermediate check points, are given. A large number of alternative routes are possible per trajectory. The student is meant to decide on the route to be followed and the type of transport to be used by using the information contained in two maps of

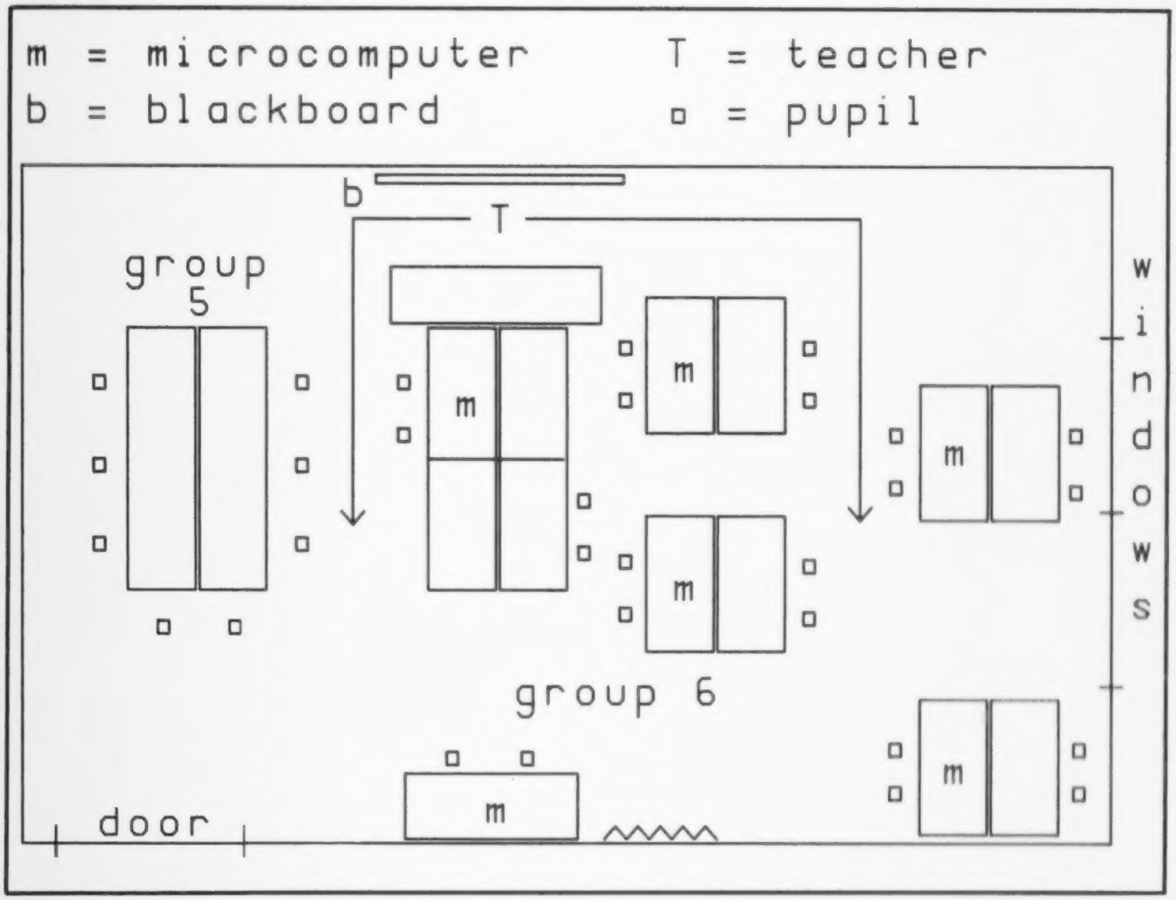


Figure 7.4 The floor plan of the classroom

different scales (See Figure 7.6). The map information on which these decisions are to be made includes:

- The type of road (footpath, highway, motorway)
- (Absolute) Distance (to be calculated on the basis of the scale indication).
- Public transport connections (bus, train, airport).
- Barriers (political borders, relief, rivers, swamps).

The combination of factors (means of transport, route and the barriers met with on the chosen route, which often also depends on the season and the time of day) provides us with hundreds of ways to go through the program. In the program itself, only a small amount of supplementary information is given, before a decision has to be made. After each choice of the means of transport and route (direction), the results can be read on the distance and time counters, as well as the day/date indication and the clock . At the beginning of each new journey, the journey time counter and the journey distance counter are reset to zero. Other counters record total time and distance. In addition to this, comments are given in the text block regarding the choice which has been made and the cause of a possible halt en route, such as a customs check, the crossing of a river or having to wait for a bus, train or airplane.

ii) Preparations

The lesson was carried out with pupils in their first year of secondary education. The teacher had 11 microcomputers at his disposal, which were set up in the computer room of the school (See the floor-plan in Figure 7.7). As the network, in common with many networks, was not working properly yet, it was decided to provide the class with 11 diskettes containing the program. A reservation had been made for the computer room, after much insistence, and the necessary supplementary material (logbooks and maps) were duplicated. The lesson was considered to be suitable for the first form, in view of the attention given to map use and to concepts such as those of absolute and relative distance, but nothing further had been done to incorporate it into a series of lessons.

iii) The lesson

The teacher described the purpose and the organisation of the lesson. The class was divided into small groups of two or three students and the lesson was set up as a competition. The scores of the various groups (teams) were kept on the whiteboard (blackboards are banned from

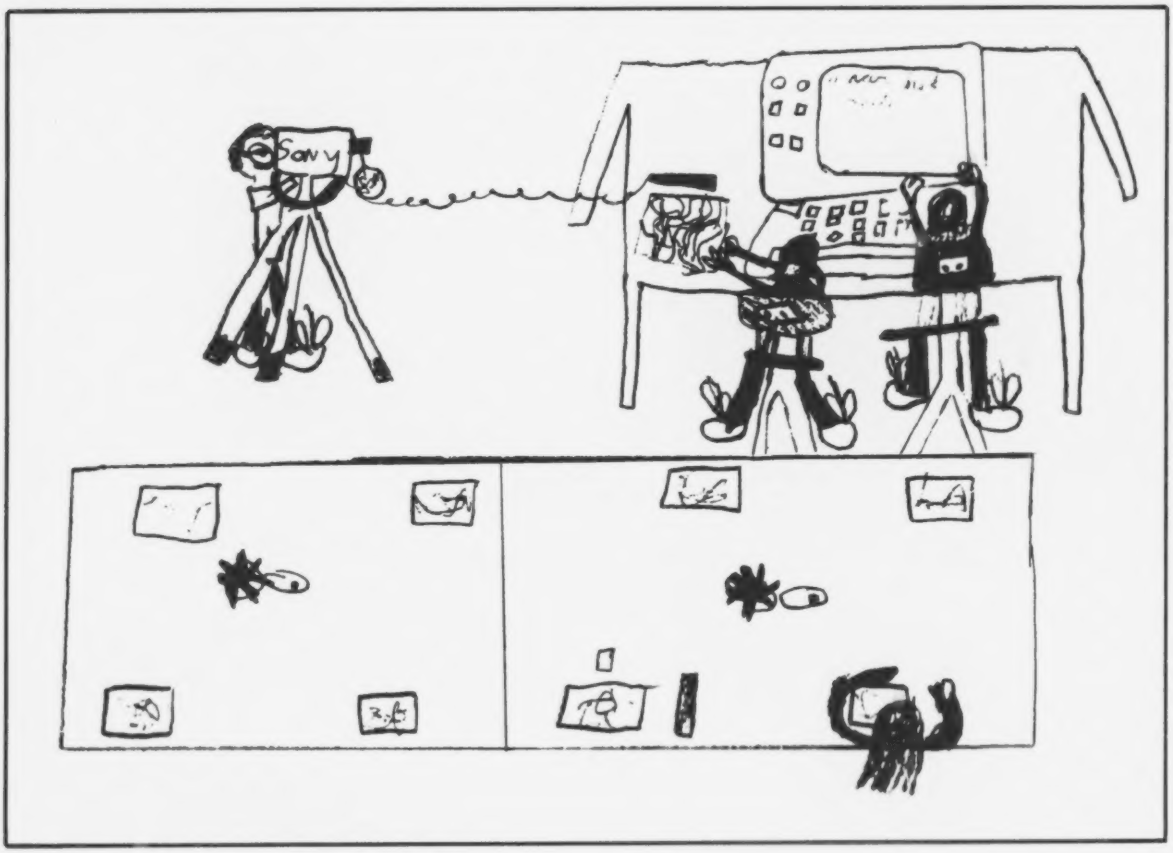


Figure 7.5 A pupil's drawing from Group 5

the computer room) and after each completed round, each team may try again to improve its scores. In the meantime, an account was kept in the logbooks of which choices were made and exactly what the results of these choices were.

Finally, an evaluation was undertaken and particular attention was paid to those factors which illustrate the difference between relative and absolute distance.

The element of competition invoked strong motivation among the students. This was frequently so strong that in excited anticipation of the finish, the pupils forgot to keep up their logbooks. In spite of this, they could usually explain in detail which factors had the greatest influence on their journey and how they learned to predict these factors from the information on the map.

During the lesson, the teacher played the role of competition leader, who ensured that the scores were recorded and gave 'first aid' when accidents occurred on the way. As far as the actual content of the lesson was concerned, the teacher did little to interfere with the weal and woe of the students. He sent them into the wide world and talked with them upon their return.

b) Analysis

Here too, an analysis of the curriculum takes place at the strategic level, but the application itself is still strongly felt to be an experiment, something for the end of term. However, the wish is expressed, given a sufficient number of good programs, to take CAL into consideration in the yearly planning sessions. This is a vital condition for the successful implementation of CAL, because the growing number of requests for the use of the computer room requires precise planning beforehand.

At the tactical level, the decision to introduce a competitive element in order to motivate the students to encounter as many of the situations included in the simulation as possible, plays a major role. The fact that the student chooses his route completely on his own during the lesson, leaves no other tactical option to the teacher than to encourage them to choose as many different routes as possible.

The teaching style during the major part of the lesson, even on a operational level, involves giving students complete freedom. The position of the students with their faces towards the wall makes it almost impossible to

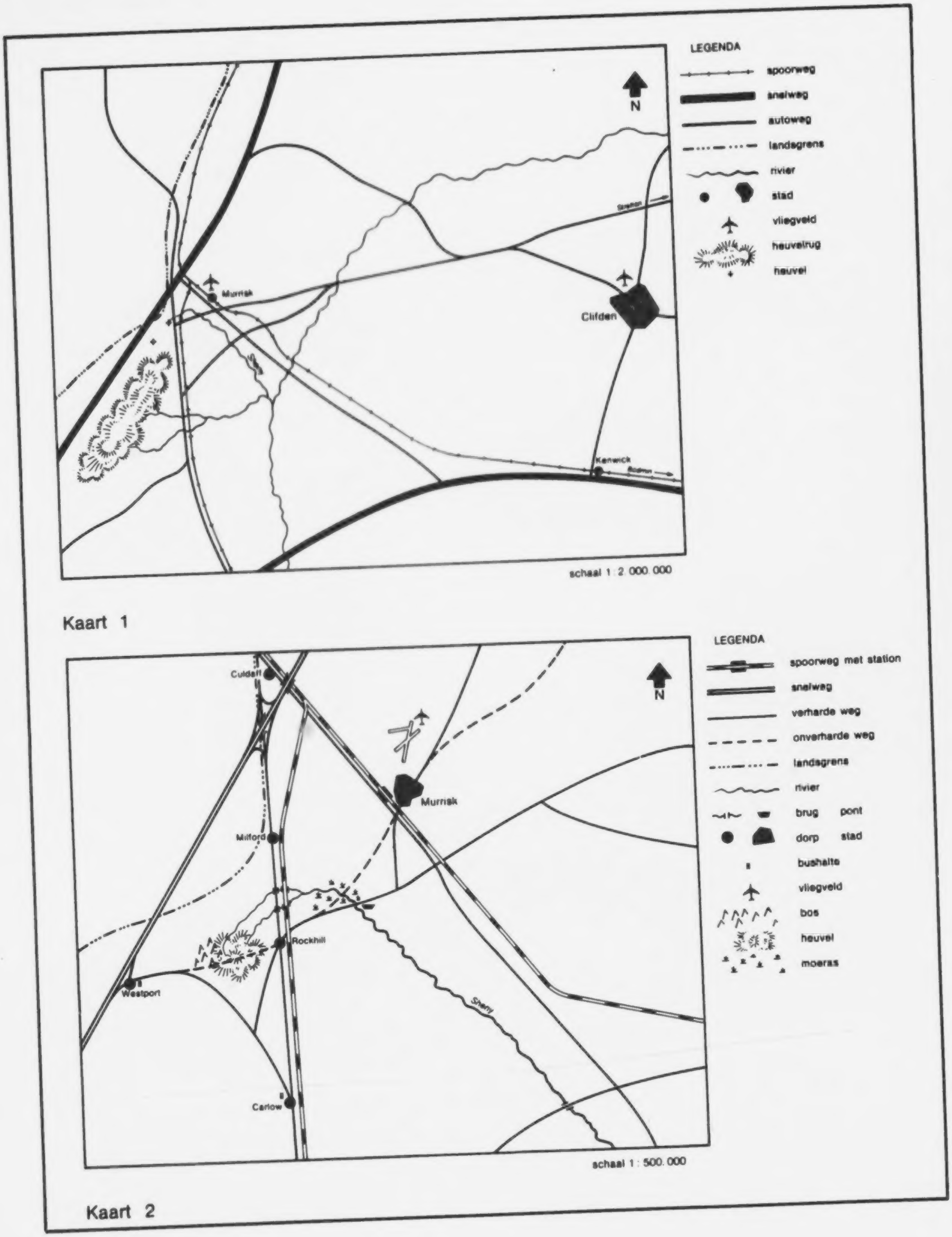


Figure 7.6 The maps used in *Rally*

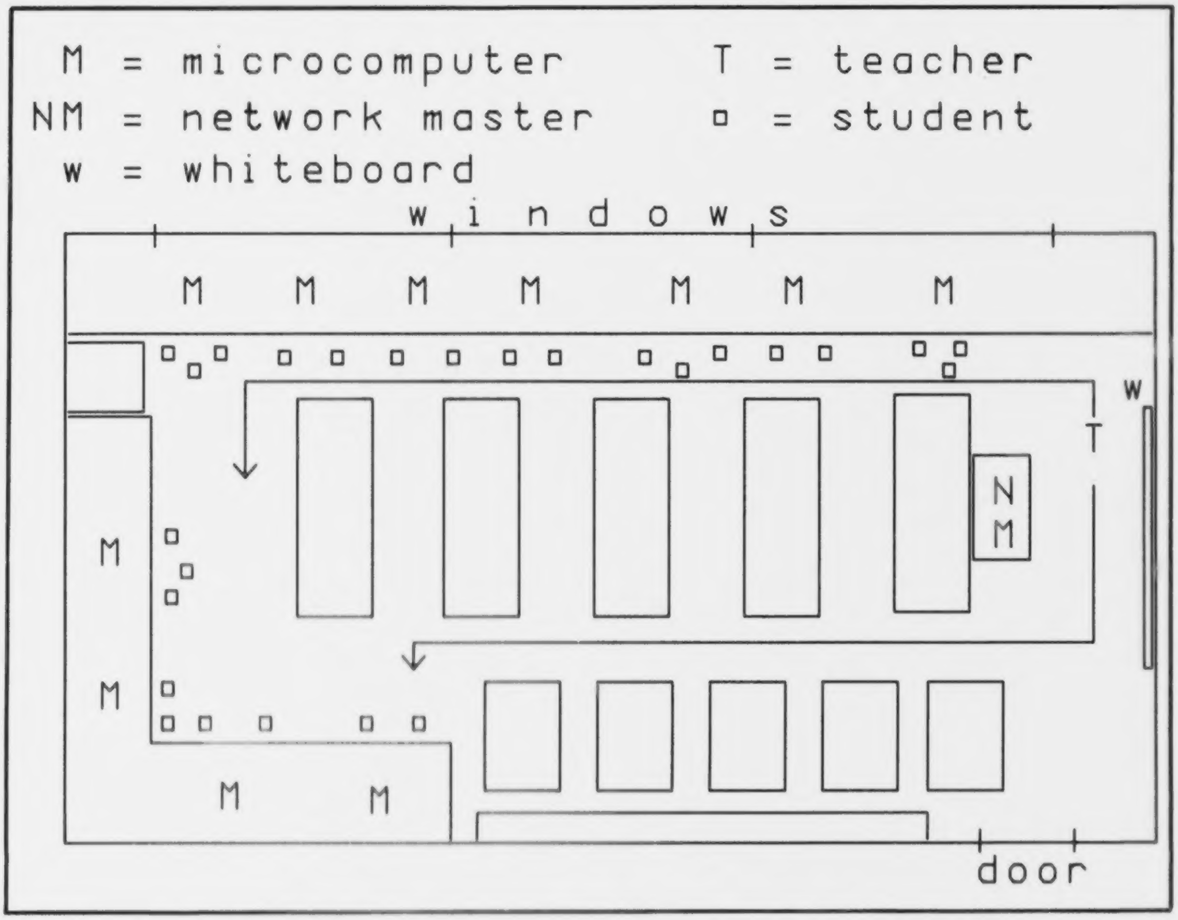


Figure 7.7 The floor plan of the computer room

TEACHING STYLE LEVEL	COMPUTER ASSISTED GEOGRAPHY TEACHING in Geography Room	 Computer Room
strategic	Decision to implement CAL (Analyses of curriculum).	Decision to implement CAL. Analyses of curriculum. Exact planning of CAL in computer room.
tactical	Organisation of hardware and software. Planning of lesson with several different activities.	Securing help from the system manager. Preparing exact time schedule.
operational	Open counselling. Flexibility to guide different learning activities. Accent on observation and help.	Role of organiser. Little subject-oriented guidance during computer activities. Accent on evaluation.

Figure 7.8 The relationship between teaching style and CAL in Geography

observe what they are actually doing. Only during the evaluation can the teacher establish some 'whole class' exchange of information on the basis of the students' experiences.

Discussion

When we try to fill in Figure 7.1 in the light of the preceding observations, we arrive at the results shown in Figure 7.8. In studying this, the reader should note that these results are primarily based on an analysis of two particular classroom situations and not on a board research study. A total of eight CAL-applications have been analyzed in a similar way, but this does not necessarily mean that they are representative of all Dutch 'CAL in Geography'.

In both examples we see teaching styles which are characterized by a large degree of open-ness. What happens during the lesson cannot be determined by the 'stopwatch planner'. There are too many short-term constraints and unexpected occurrences for such an approach. However, the technical constraints (equipment, programming) also make precise, tactical planning necessary and for this reason the 'freewheeler', will also have difficulties. When the computer room is used, much consultation with others (often non-teachers) in the school is needed. CAL-application in the geography classroom also meets with external constraints (extra computers often have to be booked in advance), but has the advantage of permitting the integration of computers with other teaching strategies. However, due to the smaller number of computers available, extra attention has to be paid to planning parallel activities.

At an operational level, in the geography classroom the teacher must be able to switch very quickly from one activity to another. Given technically reliable hardware and software, it is possible for the teacher to become strongly involved in enquiry-based learning. His role becomes that of a guide in the learning adventure.

In the computer room, the distance between the teacher and his students seems to be larger. Perhaps primarily stimulated by the somewhat chilly, office-like atmosphere, the teacher threatens to become a boss concerned only with scheduling. One consolation is that the students do not let this hinder them and cheerfully continue on their own way. Evaluation becomes, then, an indispensable element.

We may compare this situation with that of the medieval educator, who both sends his pupil on his way obliging him to report in at set times (computer room), and on other occasions goes along himself, in order to share the experiences of the unexpected with his student (geography classroom). In the first case, more tactical skills are required and, in the second case, operational flexibility is most important. In conclusion, yet another remark at the strategic level: The influence of CAL on curriculum planning in the Netherlands in 1987 is scarcely perceptible. The growing interest of 'CAL pioneers', policy makers, publishers and teachers in the interaction between CAL and the curriculum indicates, however, that this situation may change during the next few years.

REFERENCES

Beckum, J. van, H. Trimp (1986) "Dutch Geography and CAL Developments" In: Kent, W.A. (ed.), *The Use of Computers in the Teaching of Geography*, London, University of London Institute of Education (IGU publication), 45-64.

Hassell, D.J. (1982) *Teacher Style and CAL in Geography*, unpublished M.A. dissertation, University of London Institute of Education.

Hassell, D.J. (1983) "Teaching Style and CAL in Geography", In Kent, W.A. (ed.), *Geography Teaching and the Micro*, York, Longman, 43-46.

Hoek, K. (1987) *Op Weg naar het Feest in de klas* (forthcoming).

Kent, W.A. (1984) "Research in CAL", In: Graves, N.J. (ed.) *Research and Research Methods in Geographical Education*, IGU Commission on Geographical Education.

Kent, W.A. (1986) "The Use of Computers in the Teaching of Geography in England" In: Kent, W.A. (ed.), *The Use of Computers in the Teaching of Geography*, London, University of London Institute of Education (IGU publication), 147-164.

Wiegand, P. (1984) "Listening at the classroom keyhole", In: Watson, D. (ed.), *Exploring Geography with Microcomputers*, London, CET, 54-67.

PROGRAMS

OP WEG NAAR HET FEEST (1985) Author: K. Hoek. Programmer: E. de Jong. Publisher: Educaboek, Culemborg. Computer: Philips 2000.

RALLY (1987) Author: K. Hoek and H. Trimp. Programmer: H. Trimp. Publisher: Edu'Actief, Meppel. Computer: MS-DOS.

ACKNOWLEDGEMENT:

The author expresses his thanks to the teachers and students of Groups 5 and 6 at the primary school De Tafelronde in Amersfoort and of the first form at the Rijnlands Lyceum in Wassenaar.

8: TEACHING AND LEARNING GEOGRAPHY THROUGH FIELD WORK

John Lidstone

There can be few areas of geographical education where both students and teachers are in such agreement on both theory and practice as in the case of field work.

In theory, most students welcome field work as a break from the school routine and a chance to enjoy a change of scenery and activity. In theory, most teachers acknowledge the need to get students out of the classroom and into the 'real' world in order to give greater substance to topics presented at second hand in the classroom.

In practice the story is often very different. Students may often find themselves in the bind of yet more teacher talk, note-taking and information collecting, with the additional dis-incentive of arriving back at school after the normal end of the school day, while teachers are only too aware of the costs of field work in terms of preparation, administration, lost non-teaching periods and time spent leaving suitable work for the supply teacher who covers his or her normal timetable load.

In view of this, it is in the interests of both parties in the geography classroom to ensure that the benefits of field work firmly outweigh the costs. In considering field work, it does not much matter whether it is arranged as a double lesson in the school grounds, half a day in the local shopping centre, a day's coach excursion, a residential field work course or field study activities integrated into a school camp or other residential visit. The problems remain a matter of degree rather than one of kind: what educational purposes can be achieved through geographical field work? What styles of field work teaching and learning are most appropriate? How can field work be organized without undue disruption to the rest of the school population?

The purposes of field work in geographical education

Traditionally, field work in geographical education consists of a guided tour or visit, arranged by the teacher, in which students are taken to a number of vantage points to observe at first hand some aspect of the environment which has already been described in class. Alternatively, students are taken outside the classroom in order to practise some skill such as map orientation or surveying. Occasionally, some new phenomenon is introduced in the field as the basis for later classwork. Furthermore, until the 1960s, almost all the phenomena studied as part of the field work were physically observable and tangible. True, the relief and drainage of the landscape, and perhaps the soil type were related to the underlying geology by the teacher in his or her presentation, and the locations of villages, towns and factories were related to the relief and drainage, but only very rarely did the socio-economic landscape enter into field work at secondary school level. Regardless of how such field work was arranged, the teacher was usually firmly in control at all times and it would have been an unusual occasion for any student to have been out of the direct sight of the teacher for more than a few minutes.

It was as long ago as 1965 that Board distinguished between field teaching and field research techniques. For a time it became fashionable to discount field teaching while praising the hypothesis testing approach of field research. Thus, students were encouraged to propose hypotheses about, say, the types of soils to be found on different bed rocks, or the kinds of land use to be found at various distances from the centre of a city, and then to test these hypotheses in the field or by using data collected in the field. Frequently, such hypothesis-testing exercises were highly controlled by the teacher. In their most controlled form, such activities have been described by Hall (1976) as being akin to a colonial elephant hunt where pupils are placed advantageously to fall over their own environment, but are allowed to shoot their own quarry. In field work of this type, students are highly circumscribed by teacher directives although they do have quite a lot of freedom of movement. While the process is student-centred, what they discover is very much by teacher-intention.

Not all field research is so tightly teacher-controlled. In some activities, a clear hypothesis, relating perhaps to the speed of water flow around a meander or the major land use type to be found in certain parts of a city, may be proposed by the teacher and students may be given freedom to investigate it within the conventional deductive methodology. In this type of work, the teacher's role becomes that of supervisor with the duty of ensuring that students comply with all conventions of data collection and analysis.

Pocock (1983) suggests that this approach to field work research can result in field work becoming the study of any stream or any town so that students learn to ignore particular features of specific landscapes in order to force data into manageable packages within their data analysis strategy. Such students effectively learn to avoid the reality of field experiences, even that guided field experience which more traditionally came from field teaching.

There are perhaps two complementary alternatives to this problem. The first is suggested by Figure 8.1. in which field work is portrayed as presenting possibilities for students to respond to their environment at a number of levels. Each element of the matrix is regarded as being both of value in itself and also as contributing to the development of students' understanding and sense of place. The three columns may also be seen as related to the three approaches to environmental education: education in the environment, education about the environment and education for the environment. By encouraging students to develop awareness of their surroundings and to respond to their environment with all their senses, it may be hoped that they will be the more able to choose important areas of enquiry, where hypothesis testing is but one of a number of possible strategies to be used in decision making in environmental matters.

	Lower levels ——————►		**Higher levels**
Focus of field study	Undertaking land use evaluation or architectural studies. Behaving as 'The Geographer as artist'	Investigating shopping hierarchies, central place theory or rural land uses	Undertaking simulations about town planning, national parks, coastal development
Levels of student awareness	Responding to environment: showing visual awareness and aesthetic appreciation	Developing environmental understanding: investigations of the dynamics of the human and physical environment	Showing environmental concern: attitudes, values
Levels of student response	Recognising sounds, shapes, smells and colours	Classifying landscapes or investigating movements	Debating issues and taking action in relation to litter, street furniture, conservation, bird's egg collecting or inner city redevelopment.

Figure 8.1 Some aspects of environmental education developed through geography field work

The second approach to fieldwork is that espoused by the Geography 16 - 19 team in the United Kingdom (Naish et al., 1987). This approach, summarized in Figure 2, regards field work as an integral aspect of the process of enquiry rather than as a complementary, but separate, aspect of geographical education. Having selected a particular issue as the focus for enquiry, students proceed by seeking and examining data both in the field and from other sources which will help them to debate it and seek some solution. While some hypothesis testing may be involved in the examination of such an issue, investigations of the values stances adopted by the protagonists and the students themselves will also need to be considered. Thus the attitudes and values of the student body may actually become part of the field under study.

This brief summary of possible approaches to geographical field work has suggested that, in historic terms, field work has developed from a situation in which the field was regarded as an adjunct to the reality of the classroom, to one in which the classroom becomes a base from which to investigate the reality of the field. However, as in so many aspects of teaching, the style of teaching/learning adopted by individual teachers in presenting geography in the field does not change completely with the introduction of each new idea. Rather, the curriculum becomes a palimpsest in which the traditional is overlain with the innovative in an attempt to maintain the benefits accruing from both.

A residential field work course for a South London school

The section which follows describes some of the field work experiences which the writer offered to students at Carshalton High School, in one of the less favoured areas of south London. In addition to field work carried out in and around the school grounds, and on single day excursions, I arranged an annual field work visit to the North Wales holiday resort of Llandudno, some nine hours drive away from the school, during which an eight day programme of geographical field work was presented. The ideas and activities undertaken during this field work visit developed over a decade, and during later years gained greatly from the participation of groups of student teachers from the London University Institute of Education with

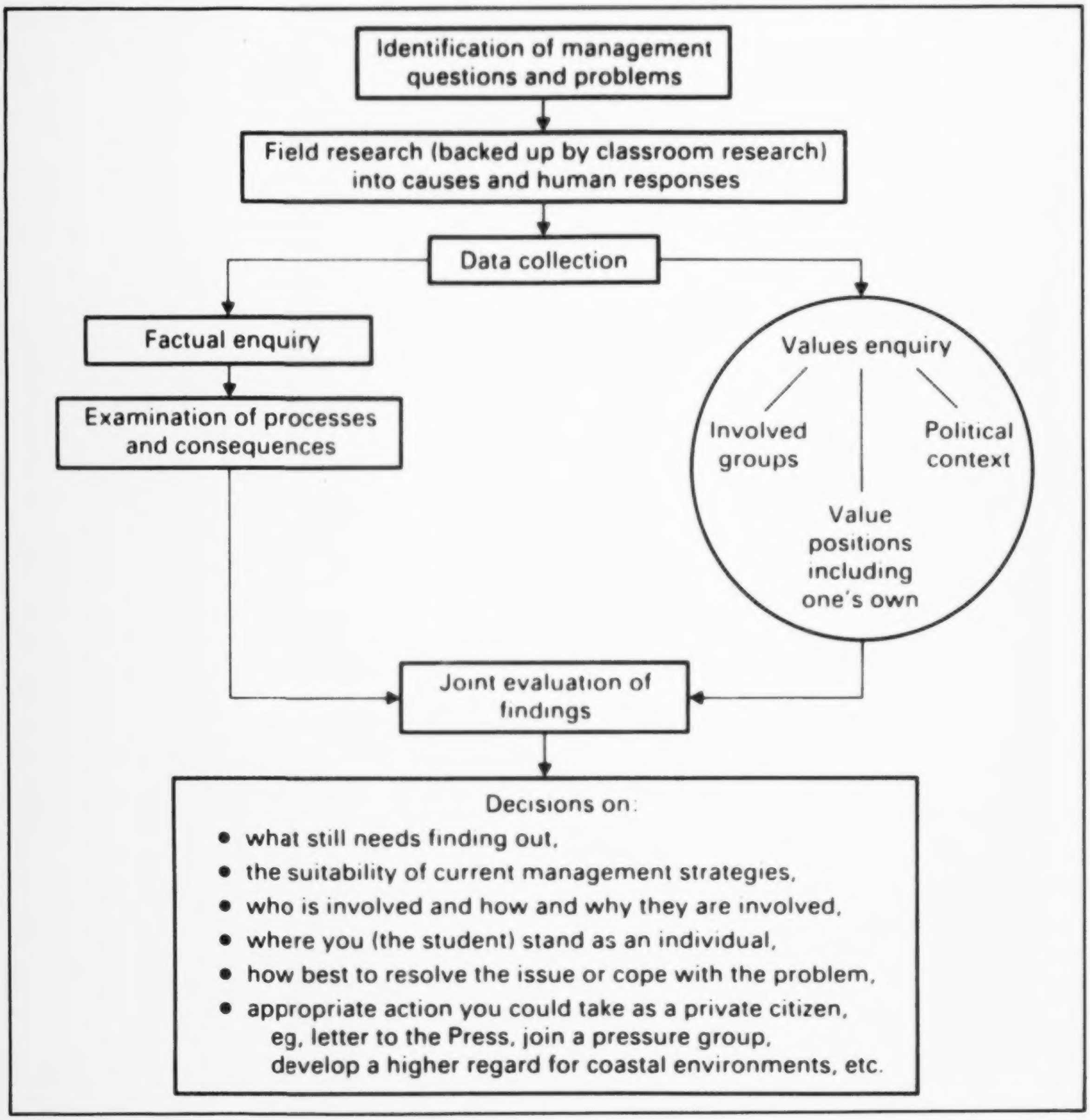

Identification of management questions and problems
Field research (backed up by classroom research) into causes and human responses
Data collection
Factual enquiry
Examination of processes and consequences
Values enquiry
Involved groups
Political context
Value positions including one's own
Joint evaluation of findings
Decisions on:
what still needs finding out,
the suitability of current management strategies,
who is involved and how and why they are involved,
where you (the student) stand as an individual,
how best to resolve the issue or cope with the problem,
appropriate action you could take as a private citizen, eg, letter to the Press, join a pressure group, develop a higher regard for coastal environments, etc.

Figure 8.2 Field work the "16-19" way (Naish et al. 1987)

their supervising lecturer, Michael Naish. In addition to the suggestions and improvements the student teachers brought to the field work planning, their presence meant an effective teacher- student ratio of 3:1. This very favourable situation helped considerably with the running of the field course, although I would contend that none of the activities undertaken would have been prohibited by more normal staffing levels. In the early years, I arranged activities very similar to those described with the sole support of my wife, Heather.

1. Field teaching/learning styles adopted

In order that the week might make a useful contribution to work for public examination courses, as well as assist in our broader aims of geographical education, we attempted to include both human and physical themes, trying to illustrate both similarities and contrasts with students' home environments. At the same time, we sought to encourage a variety of approaches to the collection and presentation of data, to provide opportunities for individual students to draw their own conclusions from them and to complement cognitive skills with the development of feelings for different environments and with consideration of their values and attitudes towards various environmental issues. With these aims in mind, the teaching strategies and summary work required from students ranged from formal field lessons to minimally-directed discovery and from essays to dramatic simulations.

The activities undertaken may be broadly divided into three: field teaching activities with a physical geography bias, educational visits with a human geography bias, and more independent investigations with a field research bias.

The three pieces of work which emphasised physical geography - those based on the Great Orme, a stretch of the River Conwy and Cwm Idwal - were the most highly structured in the tradition of field teaching, although even here, practical work on soil testing, stream flow measurements and scree-angle surveying to test hypotheses suggested in the field were included. We were conscious of the very limited time allocated to teaching physical geography in the lower school and that our students had little experience of examining physical features in the field, and so decided that a combination of field teaching and strongly guided enquiry would be most successful in exploiting these resources to the full.

Accordingly, the party strode up to the triangulation point on the Great Orme and from this vantage point, a question and answer session on map orientation and identification of features ensued. A convenient disused quarry near the summit which displays well-formed and slightly dipping strata and a multitude of fossils, together with a bottle of acid, led to the group identifying the Orme as being of limestone, while further questioning and encouragement led to students hypothesising about the depth and type of soil to be expected. An auger and soil test kit revealed that the expected shallow alkaline soil did not occur over much of the summit area and this led to further hypothesising and testing.

Although all students in this latter part of the study were given samples of the soil to handle and to test for clay and sand, its pH value was assessed only by one or two boys at each site under the instruction of the teacher. The students were, therefore, essentially receptive of information and similarly, their summary that evening was in the form of a written account with annotations on sketch diagrams.

Much the same teaching technique was adopted in the study of a stretch of the River Conwy near Trefriw, although in this case groups of seven or eight students, each with a teacher, set out separately to seek evidence that the river had, and was continuing to change the course of its channel. Map evidence from 1:10 000 topographic map extracts was interpreted in the field while differences in the speed of surface flow on the inside and outside of meanders were measured with floats, enabling the teacher with each group to draw attention to the river cliffs. On the day of this visit, the river was in flood and had inundated large areas inside its meanders. In places it had removed its soil to reveal beds of well-rounded pebbles beneath, while the limbs of an ox-bow were once again under water clearly showing the original line of the channel. The various pieces of evidence explained in the field were noted by the students and described in map annotations that evening.

In addition to these examples of field teaching by teachers and trainee teachers, the week-long field excursion also included four guided tours. Tours of the Gwydyr Forest, owned and managed by the Forestry Commission, the Ffestiniog Pump Storage Hydro-electric scheme, the Llechwedd Slate Caverns, and the Dolgarog aluminium works were arranged to show the students four different economic facets, past and present, of Snowdonia, as well as to illustrate the effects of various land uses within a National Park. Students were asked to observe the processes involved, the number of workers employed and the conditions under which they worked, bearing in mind that the first three of the undertakings listed above have become tourist attractions in their own right.

Our students were not asked to make formal notes on the visits since experience has shown firstly, that professional guides frequently object to, or at best ignore, leading questions from teachers, and secondly, that students often find difficulty in differentiating between details of geographical significance and technical minutiae. Furthermore, the purposes of the visits were intended not only to add to our students' understandings of the more conventional geographical ideas about land-use on step slopes, the suitability of glaciated areas for hydro-electricity generation and the one-time close relationship between HEP and aluminium smelting, but also to raise the issues of the relative paucity of employment prospects in this part of Wales and the problems of a resident population living in an upland national park. Accordingly, students in groups of very mixed ability were asked to prepare a "television news report" for presentation to the rest of the party. Each group chose one of the visits and gave its interpretation in simulated interview/report style of what they had seen in answer to the question: "Is there a social crisis in this part of Wales?" For this activity, students of different levels of ability were grouped together in order that they might learn to respect one another's contributions and skills. The experience also helped students to learn management skills such as making efficient use of available human resources. The various social backgrounds of each group helped all the students to appreciate more fully the problems facing the local people.

In this exercise, our students needed an ability to empathise with people living in an environment very different to that of their own home area. They also needed to be able to express orally their interpretations of life in a remote rural community. Some students, coming as they did from a south London suburb, found it very difficult to imagine living in such an area. In particular, some found it hard to understand why the Welsh language was often used and why Plaid Cymru (Welsh Nationalist) slogans were daubed on walls in an area they had clearly regarded as just another part of Great Britain. Other students were better able to understand the resentment felt by residents against the English use of Wales as a playground and water catchment area. In presenting their reports, students with greater facility in oral expression tended to adopt the role of interviewers. These interviewers gave direction to their fellow students who wanted to identify with such groups as retired slate miners suffering from the dust-induced lung disease, silicosis, or small shopkeepers faced with an ageing and declining population. The least able seemed to be most at ease playing the roles of unemployed teenagers and school students.

While the exercise described above was a relatively unstructured response to very structured field experiences, the week's programme both began and ended with activities designed to encourage the party to work in groups in the field without direct adult intervention.

The initial activity of the week was designed to help the students to find their way around the town of Llandudno and to get to know their colleagues in the party. On the first evening, students were told about the origins of the town, the sale of the Mostyn estate in 1849 and the decision of the Board of Town Commissioners in 1854 to control the development of the town as a tourist resort. Two questions were then posed: firstly, has the plan of the lots which was drawn up for the 1849 sale and the restrictive covenants which were imposed at that time had the effect on the town today that the Board originally intended - namely that "the town that is to be shall resemble as far as is practicable , the 'country', securing at the same time in the laying out of the various plots of ground, order and uniformity"; and secondly, is there any evidence of a pattern of development influenced by pre-existing routeways or concentric developments? In order that they might investigate these two questions, students were shown the architectural styles typical of the various historical periods and then, in small groups, surveyed sectors of the town, mapping the ages of the buildings, the general environmental quality of each street in terms of greenery, street furniture and general appearance, and land use. The results were then assembled to provide a series of 1:2,500 maps of the town and the findings discussed during the evening work session with reports being given by each group.

The final activity of the week placed students in the role of planning consultants investigating the demand, and possible sites, for a new sports complex in one of two adjacent towns on the North Wales coast. Students again worked in mixed ability groups to conduct street interviews to discover the demand for such a complex, to survey existing sports facilities and the extent of each one's sphere of influence and to map the location of the most accessible areas of each town and existing land use to reveal potential sites. Each group was told to prepare its case, with maximum use of visual aids, for a "planning enquiry". Students were left to distribute the various tasks, both of data collection and presentation, among themselves. Thus one group organized itself so that two of the more able students analysed the local 'bus timetable and route map while two less able students carried our pedestrian counts at various points. Both pairs demonstrated that towns have some areas of greater movement density than others but used methods of very different complexity. Having compared their results, the students were able to suggest possible links between 'bus services and density of pedestrian movements, and on this basis make suggestions about the most suitable area for a new sports complex.

The "Planning Enquiry", which was videotaped by one of the teachers, was the high spot of the week for both students and staff. No one seriously questioned the need for a new complex to be built and each group strove to justify its particular town for the new location. The debate could have gone on all night. The arguments flowed back and forth with good geographical principles being expounded with no teacher prompting. Tempers sometimes ran high and if some students suggested physical violence as a way of reaching a decision, they were, after all, only simulating one of the less desirable features of our society. The facility of statistics to be double-edged was appreciated by all the students and few if any failed to make some verbal contribution. Interestingly, it was not one of the more able students who pointed out that the site eventually chosen was currently occupied by an old building used as a rest room for elderly people while shopping and urged that alternative provision be made for them as an integral part of the proposal. In all, cognitive skills were proved appropriate means to affective ends and all the teachers involved were heartened at the confirmation that even students of very modest abilities in "normal" school work have a capacity for analysis and evaluation when highly motivated.

Both these activities made demands on students at a variety of cognitive and affective levels. In the case of the sports complex simulation, the time limit imposed meant that even those of very modest ability had to be given a role by the group if the task was to be completed. For some of the least able students it was probably the first time that they had been really needed by their peers. The more able frequently took on the more cognitively complex aspects of the investigation, but other students often gained experience in the efficient allocation of human resources by, for example, allocating their more talkative colleagues to interviewing tasks and the more artistically inclined to producing annotated artist's impressions of possible sites after development. Furthermore, mixed ability grouping made it possible for less able students to partake in a relatively complex activity and contribute to a well polished end product.

2. Student evaluation of the field work activities

At the end of the week we invited our students to judge the activities in which they had partaken, the three modes of working and the various ways in which they had been asked to respond to the activities. In order that the evaluation did not become onerous and spoil the excitement of the final evening, the students were merely asked to place the ten activities undertaken in rank order of preference according to their enjoyability, their interest and their usefulness. The results are shown in Figure 8.3.

Activity	**Enjoyability**	**Interest**	**Usefulness**	**Teaching method**	**Pupil activity**	**Method of summary**
Growth of Llandudno	6.5	6.0	4.8	T/P	R/D	Q/A/R
Site of Sports Complex	4.4	5.0	6.1	P	F	D/R
River Study	6.0	4.0	3.5	T	R/D	Q/A
Cwm Idwal	7.0	6.2	2.6	T	R/D	Q/A
Great Orme	5.0	5.0	5.4	T	R	E/A
Blaenau Ffestiniog	7.7	7.5	8.0	P	F/D	D/E
Gwydyr Forest	1.7	2.7	3.6	G	R	D/A/E
Ffestiniog Pump Storage	4.0	4.5	5.0	G	R	Q/D
Llechwedd Slate	2.0	2.2	5.3	G	R	D/E
Dolgarrog Aluminium	5.0	5.5	5.0	G	R	Q/D/A

Key: All figures refer to median rank: N = 32.

Teaching methods defined as:
G - led by a Guide
T - led by a teacher
P - group of pupils working unaccompanied

Pupil activities defined as:
R - pupils receiving information
F - pupils engaging in free enquiry
D - pupils engaging in directed enquiry

Method of summary defined as:
E - account or response to a question presented in essay form
Q - answers given to specific questions
D - information collected or reactions presented to rest of party in dramatic form
R - information collected reported back to rest of party in more formal manner
A - information recorded on prepared diagrams as annotations

Figure 8.3 Pupil's views of individual field study activities

Figure 8.3 shows that the teacher-led field teaching exercises on aspects of physical geography were rated fairly low for enjoyment, only slightly higher for interest but, with the exception of the work on the Great Orme, markedly higher for usefulness. A very unstructured visit to Blaenau Ffestiniog was regarded as being of low enjoyability, interest and usefulness, while the various industrial visits were regarded as being generally interesting and enjoyable, but only the forest visit was seen as being useful. On the other hand, the structured but unsupervised work on the town of Llandudno was regarded as being of low interest and enjoyment, but quite useful. Finally, despite the great enjoyment and interest aroused by the Sports Complex simulation, our students regarded the day as less than useful.

Our simple evaluation instrument did not reveal why students regarded some activities as being of greater use than others, nor how they interpreted the word "useful" in this context, but it may be surmised that perceived relevance to overall school success as measured by both public and internal examinations would have had an influence. Overheard student conversations suggested that the students differentiated in their own minds between activities found interesting and those found enjoyable, although the differences recorded in the survey were not significant. However, there is a strong negative correlation between those activities found to be interesting and enjoyable and those found to be useful. Perhaps this finding raises more questions about the school curriculum as a whole than it does about the field work experiences.

Figures 8.4 and 8.5 reveal some further interesting perceptions by our students. Figure 8.4 shows the results of asking students to rank "visiting a works or elsewhere where a guide talks to you", a visit where "one of your teachers talks to you" and "being given a problem to solve as a group". The students' preference for explanations from their own teachers, and for explanations from a guide rather than discussions with their own peers is borne out by their selection of such activities as the river study and work at Cwm Idwal as being of greatest usefulness. The implication of this finding is once again that too much of the curriculum experienced by these students had been teacher directed and that they had therefore developed excessive reliance on knowledge being received from a teacher.

The influence of a traditional curriculum is also revealed by the students views on the relative merits of essay writing, answering questions, annotating diagrams or maps, reporting back to the whole party and dramatic presentations. (Figure 8.5) Essay writing was regarded as useful, but relatively unenjoyable. Dramatic presentations, on the other hand, were regarded as enjoyable but of little use.

	Guide	**Teacher**	**Group work**
Median rank: N = 32	1.6	1.1	2.0

Figure 8.4 Preferred teaching method

Method of summarising work	Enjoyability	Usefulness
Essay	2.8	1.2
Answering questions	2.6	3.1
Dramatic presentation	1.6	3.2
Reporting back to party	2.8	2.6
Annotating diagrams	1.8	1.9
All figures as median rank: N = 32		

Figure 8.5 Pupil's views on ways of reporting field work findings

Is field work in geography really a separate teaching style?

That field work has come to be regarded as a separate undertaking from "normal" geography lessons is probably more a reflection of the practicalities of school life as presently arranged than of any such perception by geography teachers. Good teachers have always appreciated the educational merits of providing their students with immediate contact with their environment. Why else do we hump great chunks of rock home from our annual holidays to show our students or take countless colour slides to show that even though we cannot always take our classes with us, we have undertaken innumerable experiences on their behalf? Furthermore, field work has traditionally been seen as an opportunity for students to develop a number of skills. The majority of teachers realize that the skills of careful observation and recording may be both cause and effect of curiosity and awareness, that through initial observations, students may acquire techniques such as mapping, drawing, photography, video- and audio-taping and report writing. The examples given above have emphasized that, socially, field work may contribute to developing our students' empathy with environments, landscapes and life styles with which they are not familiar, an awareness of the importance of division of labour to achieve specific goals, tolerance of varying points of view and acceptance of the strengths and weaknesses of others.

Many teachers will bear witness that where discovery, exploration and creativity are the essential points of departure for field work, the role of the teacher changes to become that of consultant and enabler and many students welcome the opportunity to plan their own work schedule and respond positively to the gesture of trust which such work implies. Some teachers may regard this type of field work as a retreat from rigour and a secession from skills. However, if it is really our intention to encourage our students to gain their geographical knowledge and skills through enquiring into questions, issues and problems as they affect human beings and the globe, then field teaching, and field research in both its 'scientific' hypothesis testing and values/aesthetics investigative forms must be regarded as an integral part of the teaching and learning endeavour in geographical education. Perhaps, then, field work is not a separate teaching style to be adopted in geographical education, but a sine qua non of all good education through geography.

REFERENCES

Board, C. (1965)"Field work in geography, with particular emphasis on the rate of land-use survey" in Chorley, R. J. and Haggett, P. (Eds.) *Frontiers in Geographical Teaching*, London, Methuen.

Hall, D. (1976) *Geography and the Geography Teacher*. London, George Allen and Unwin.

Naish M.C., Rawling, E. and Hart, C. (1987) *Geography 16 - 19: The Contribution of a Curriculum Project to 16 - 19 Education*, Harlow, Longman.

Pocock, D (1983) "Geographical Field Work: an experiential perspective" *Geography*, 68, 319-325.

9: STYLES OF TEACHING GEOGRAPHY IN A DEVELOPING COUNTRY - BRAZIL

Marcos Mucciolo

Brazil may be described as a developing country in terms of its socio-economic development. The same may be said for its education system which is still struggling to provide basic education for all its children. This struggle, which has continued throughout the nineteenth and twentieth centuries, provides an interesting study of the ways in which different colonial powers and types of government have influenced the teaching styles of Brazilian geography teachers. This paper will consider the Brazilian approach to geography teaching from two standpoints:

1. the teaching of geography at different periods throughout the nineteenth and twentieth centuries, and
2. the style of geography teaching being adopted in Brazilian schools today.

Styles of geography teaching in the nineteenth and twentieth centuries

Brazilian education has undergone distinctive developments in five time periods up to the 1970s. These were:

1. Up to the early 1900s.
2. The 1930s and 1940s.
3. The 1950s.
4. The 1960s, and
5. The 1970s.

Each of these periods of development was associated with its own style of teaching. However, since each period involves changes of government and prevailing cultural influences, there is no evidence that each style of teaching geography evolved from the preceding one. Hence, the teaching of geography has not evolved as rapidly as in some other developing countries.

1. Up to the early 1900s.

During this period, geography was taught by non-professional people who had no technical or specialist pedagogical training. To acquire the status of teacher, all people had to do was to take a test from the traditional Colegio Pedro II (founded in 1837).

The amount of geography teaching was limited and that which did occur was strongly expository in style typified by lectures delivered by the "teachers" and passive roles by all students. Students had no opportunity to participate actively in any geography lessons.

2. The 1930s and 1940s.

During this period, Brazilian education was unfluenced greatly by French culture. The forerunners of the Sao Paulo State University and the Rio de Janeiro State University were established in the mid 1930s. For the first time we had specialist geography teachers such as Onorio Silvestre. In addition, French educators such as Deffontamies, De Martonne and Ruelan, came to Brazil to demonstrate how to teach geography. They espoused a style of teaching that was academic and it placed great emphasis on the knowledge of facts. This involved a large amount of memorization. Studies in physical geography were very important and became the focal point of university studies in geography.

Graduates from these universities could obtain a licence to teach geography or history. Like the earlier non-professionals, these Brazilian geography teachers adopted an expository approach to their lessons, with an emphasis on learning facts. However, Prof. Miguel Alves de Lima has shown that during this period there was an increased emphasis on practical experiences in the field and this approach was expounded especially by the great scholar and educator, La fayete Rodrigues.

Of particular importance to the development of geography in Brazil at this time were:

- the field trip undertaken by De Martonne and J. Dias Silveira to Itatiaia to study the geomorphology and physical geography of Rio de Janeiro state.
- the doctoral work of Pierre Monbeig on the sociology of Sao Paulo.

3. The 1950s.

During the 1950s the emphasis in university geography moved from physical to human geography. In fact, history and geography were taught together in the existing universities. This allowed prospective teachers to choose subjects that they wanted to study in geography and meant that they taught the subjects for which they received the highest marks. However, whatever aspect of geography they chose to teach, all these graduates possessed a strong historical basis to their qualifications although their pedagogical training remained very limited.

4. 1960s.

The 1960s was a period of social and political upheaval in Brazil. The Juscelino Kubistchek government moved rapidly to modernise the Brazilian economy and the university at Brasilia was established. However, in 1964 a military government took over the control of the country and american-styled education was introduced to Brazil. Under the 5692 law, learning in Brazilian schools was reformed, resulting in geography having to be taught with history in a form of Social Studies. (Reforma do Ensino) Teacher education courses in social studies were instituted instead of geographical and historical education. Social and human geography studies were classified as "dangerous sciences" and were not encouraged in case they caused trouble for the military.

During this time, many qualified teachers migrated to other countries because they could not tolerate the close observation of their classes and the military intervention. Geography teachers could use little audiovisual material in their lessons and were encouraged to use textbooks that had a strong American perspective. These political conditions promoted even more expository teaching in the newly integrated classrooms.

5. The 1970s.

During the 1970s geography teaching almost disappeared in Brazil as expository Social Studies became cemented in the education system. It was only towards the end of the 1970s that there was any "open" discussion about education. While the amount ot teaching of geography in schools and universities was limited, there was considerable time available for research using quantitative positivist methods, although these studies were mainly into aspects of geography rather than geographical education.

Geography teaching in the 1980s

The style of teaching geography in Brazil in the 1980s has changed, but the changes have occurred mainly in the large cities of Sao Paulo and Rio de Janeiro. Instead of "chalk-and-talk", expository lessons, geography teachers are now putting more emphasis on values and the feelings of the students. Unfortunately, in the rural areas the persistent problems of untrained teachers and poor salaries, still prevail.

Geography teaching styles in Brazil today

The geography teachers who are working in the main cities of Brazil today may be classified as follows:

a) The most progressive teachers do not see geography as a physical science. Rather, they believe that geography can promote social change and encourage students to become conscientious citizens who are aware of social and environmental injustices and who are willing to work towards minimising them in their societies. These teachers adopt a style which uses some expository methods and some scientific basis, and which puts considerable weight on valuing strategies and the development of empathy towards other people and cultures. Such approaches are common in many middle-class, urban schools, but even here they are probably used by only about 30% of the geography teachers. In such schools, students have their own textbooks and a few of the classes learn from audiovisual materials and geographical references, such as journals, television documentaries and newspapers.

b) The second type of geography teacher relies very heavily on the use of a textbook alone. The content in each textbook and the associated questions/activities control the geography that is taught by these teachers. They use "chalk-and-talk" exposition and the students become passive note-takers whose main aim in geography is to memorise a set of geographical facts. These geography teachers are evident in lower class urban schools and in rural schools. In fact, many of these teachers have more than one job and may be required to give more than 45 classes in a week.

c) The third group of geography teachers has no professional training. Such teachers are frequently located in rural areas where students cannot afford more expensive education. Their style is expository and repetitive. There is no discussion of the content of geography by these teachers but a strong focus on facts. Little is learned by students in these geography lessons, but under the current system the students still move into the next grade at the completion of a year's classes.

Conclusion

There is strong evidence that the style of geography teaching in Brazil is developing. As the result of the many seminars, conferences and in-service activities that emanate from Sao Paulo and Rio do Janeiro, schools are being encouraged to use video recorders and computers in their geography lessons. Our largest television network is now providing educational television programs for geography students, but at present there are few computers being used in geography classes.

Although the media are being encouraged to promote more active learning in geography, economic constraints mean that it is unlikely that these developments will be rapid and the prevailing styles of geography teaching will ramain for some years to come. The real problem is that geography teaching in developing countries is always one step between those used in developed countries. It will continue to remain the case until the governments can provide more funds and teacher support to promote the teaching of geography in these countries. However, I am optimistic that the styles of geography teaching adopted in Brazil will continue to develop in the future.

Section B

Developing learners' skills and abilities in geography

10: SKILLS IN SCHOOL GEOGRAPHY: FROM TEACHING TO LEARNING

Bernard Cox

The purpose of this paper is to open a discussion on skills associated with geography in schools. Several overlapping clusters of skills have been referred to in the literature in geographical education, including geographical skills, motor skills, study skills, social skills, and cognitive skills. Other references have been more specific and have described skills such as those in map reading and interpretation. Skills are vitally important to school students because they provide the means whereby learning takes place. The way in which students acquire skills affects the meaningfulness and utility of the skills to the students using them. In recent years skills associated with school geography have undergone a change in emphasis. This change involves movement away from approaches to teaching the skills to students toward fostering self-direction skill learning by the students. The shift in emphasis is associated with the importance recently given to metacognition as a source of principles guiding learning activities.

Traditional approaches to skills (Chapin and Gross, 1973) focus on the activities of teachers in helping their students to acquire skills. The metacognitive principles (Reynolds and Wade, 1986) orchestrate the approaches that students might use to observe and guide their own learning and use of skills. This paper provides several examples of traditional and metacognitive approaches to learning skills in geography. They are considered in the light of a rationale (associated with life roles) for the inclusion of geography in the school curriculum. The paper concludes with suggestions for a way of structuring learning units in geography so that the units overall are consistent with the emphasis on learning by students rather than on teaching by teachers.

Identifying skills associated with geography

To find out how the word "skills" is commonly used in association with the teaching of geography in schools, a review was made of references to skills in the recently revised geography syllabus in Queensland, Australia (Board of Secondary School Studies, 1987). Recent statements about skills published in the U.S.A. (National Council for the Social Studies, 1984) and Great Britain (Department of Education and Science, 1979) were also reviewed.

Skills are referred to frequently in the Queensland geography syllabus and although numerous examples are given, no formal definition is provided. Skills are noted in association with knowledge, processes and values, with the implied suggestion that the boundaries among them are blurred. Skills are also linked frequently with abilities, and the terms seem to be used synonymously (B.S.S.S., 1987:7). The consistent use of the term "skills" with the other terms just noted probably derives from the use of them in the parent document (B.S.S.S., 1978:38-9). This parent document refers to process competency as being "the acquisition and exercise of specified cognitive skills in a particular subject" and to practical skill competency as being derived from "the acquisition and exercise of specified practical skills in a particular subject", such as geography. The syllabus sub-committee for geography has stated clearly that skill objectives involve observation, recording data and reporting findings. (B.S.S.S.,1987:8). They are as follows:

"Skills Objectives"

The development of skills relevant to the study of geography should continue throughout years 8, 9, and 10.

Students should develop practical abilities in relationship to:

a) Observation

Collection of information about perception, location (including distance and direction), distribution (including pattern, density and dispersion), association, movement, and change of features by means of:

- direction observation;
- indirect observation of print and non-print resources;

b) Recording Data

- Map making;
- drawing sketches, diagrams and flow charts;
- preparing statistics in tabular or graphic form;
- recording interviews;
- recording measurements from instruments;
- collection of samples/specimens;

c) Reporting Findings

- Organising information from individual/small group/class reporting;
- using graphics, models, films, photos, video tapes and

slide-tape presentations;
- using clear concise expression in written and oral forms".

This statement about skills from the Queensland syllabus sub-committee has the following characteristics:

1. It is oriented toward activities to be undertaken by students.
2. Its framework for organising the skills suggests a focus on inquiry by students.
3. It relates the "skills" or "practical abilities" to some of the key concepts of geography including such concepts as location, distribution, and movement.
4. The activities in the list are essentially means rather than ends in themselves.
5. It is not comprehensive.

A more comprehensive list of skills was drawn up by a Task Force of the National Council for Geographic Education in U.S.A. (1984:260-261). Skills are classified as follows:

1. Related to Acquiring Information
   - a) Reading Skills
   - b) Study Skills
   - c) Reference and Information Search Skills
   - d) Technical Skills Unique to Electronic Devices
2. Related to Organising and Using Information
   - a) Intellectual Skills
   - b) Decision-Making Skills
3. Related to Interpersonal Relationships and Social Participation
   - a) Personal Skills
   - b) Group Interaction Skills
   - c) Social and Political Participation Skills

There are numerous entries in each of these categories. Some of the entries exemplify motor skills, others are largely intellectual processes, while others have strong affective elements. The NCGE document opens the possibility of connections among cognitive skills, motor skills, and affective skills.

In the United Kingdom, consideration of skills in school geography was catalysed by the "Great Debate" (Williams, 1985:129). The views held by the Department of Education and Science (DES) and Her Majesty's Inspectorate about the school curriculum and the place of geography in the curriculum stimulated much activity by the Geographical Association. The Association prepared statements about the skills geography claims to develop, for example:

"In geography that (skills of long-term value) means practical investigations, both inside and outside the classroom...geographical inquiries in defining the questions to be tackled; in planning the methods to be used; in collecting, analysing and interpreting information; and in presenting their findings in a suitable form." (Joseph, 1985:292)

A clarifying statement which seems to encapsulate British thinking about skills in school geography appeared in a DES publication. The statement reads:

"The development of geographical understanding cannot be separated from the acquisition of intellectual skills. When pupils are required to select appropriate information, to compare, to classify, to search for patterns, to apply concepts and generalisations, they are required to engage in mental activity. Geographical learning is more than a matter of receiving information. It is an active process involving the gradual development of ideas which themselves become the basis for further thought. The term "skill" is applied to achievements that range from simple physical control and manipulation, such as that required to draw maps or use equipment, to complex mental processes.

In each case, however, use of the term implies an ability acquired through learning that relates to a specific activity or type of activity and an acceptable level of achievement in that activity. The later section on mapwork illustrates both the variety of skills called for in a vital aspect of geography and the close links that can exist between skills and knowledge. To interpret a relief map pupils must know something about landforms and drainage patterns as well as be able to identify features shown by contours and other conventional means of representation. The notion of skills in geography should not, however, be restricted to mapwork. Intellectual skills, such as the ability to interpret and analyse a given situation and apply the conclusion in a new setting, contribute fundamentally to the development of generally applicable study skills such as literacy, numeracy and the ability to use a variety of source material, books and maps." (D.E.S., 1979:10)

This British view of skills in school geography emphasises two points:

1. the term skills can be applied both to simple physical activities and to complex mental processes, and
2. both kinds of skill contribute to interpretation and understanding in geography.

The viewpoints from Australia, U.S.A. and Britain are interesting because:

1. they help identify some of the attributes of skills and

2. they open the question of the distinction (if any) between skills and abilities.

The attributes about which there is agreement include:

1. bodily dexterity, including hand to eye co-ordination, as an element of practical skills,
2. cognition (the process of knowing) which is involved in the performance of all of them,
3. widespread application, so that no skills can really be claimed to belong uniquely to geography. Perhaps they should be referred to as "skills used by geographers", rather than as "geographical skills", and
4. a functional quality which causes skills to be essentially means toward further ends, such as understanding, or transmission of ideas, rather than ends in themselves.

These attributes of skills are well exemplified in the way they are treated in the Queensland syllabus. It argues that geography can serve as a medium for the attainment of a broad range of educational objectives. Students acquiring skills in geography are better able to explore their present and future life-roles as:

*"**Social/Being:** Where to rent or buy a house in relation to family, work and recreation patterns.*

Recreator: Where and when to holiday and how to use leisure time for the benefit of self, the community and the environment.

Producer: Where to find work and the costs and benefits of environmental controls on industry.

Consumer: Where to shop, alternative transport patterns, and whether to purchase goods that might be over packaged or produced by socially or environmentally unjust means.

Citizen: How to encourage others to conserve the environment and analyse the social and environmental implications of political issues.

Learner: How to acquire information, evaluate and interpret information and to make decisions.

Decisions on questions and issues such as these are based upon the geographical knowledge, values and skills acquired through life's experiences, some of which may be school studies in geography. Such knowledge, values and skills may be considered a "personal geography". It is the aim of school programs in geography to provide learning experiences which extend and refine the "personal geographies" of students.

These experiences which include studies at local, national and global scales enhance all life roles by encouraging and preparing students to become informed, reflective and involved. In this way, they will become more effective in meeting the social and environmental questions, issues and problems encountered in daily life, and more skilled in their life roles." (B.S.S.S., 1987:5)

This is a fine rationale for the inclusion of studies of geography in the school curriculum. It is evident that the geography sub-committee believes that skills contribute to students becoming informed, reflective and involved and that such qualities lead to an enhanced capacity to undertake life roles.

Queensland's syllabus associates skills with practical work (page 9). The skills noted in the syllabus are based on maps, photographs, statistical information, graphs and diagrams as well as on direct observations in the field. The British and American publications support this view of skills. More importantly, all three sources emphasise the close links between practical activity and understanding. These links relate to the rationale for including geography in the school curriculum. The rationale emphasises understanding the present and future life role of students.

Distinguishing skills from abilities

The *Macquarie Dictionary* defines skills as *"the ability that comes from knowledge, practice, aptitude, etc., to do something well. Competent excellence in performance; experiness; dexterity"* (Macquarie, 1986:1586). It would seem that the Queensland syllabus sub-committee has support for using skill and ability interchangeably, but as they are being used in the specific context of human learning, increased understanding may come from reference to educational psychology and to the use of skill and ability as psychological terms in education.

Before making these references it will be clarifying to establish one way in which teachers think about skills as part of human learning. A teacher's report on the achievements of a student of geography in the senior years of secondary school might take the form suggested in Figure 10.1.

Many teachers are able to write such profiles of achievement for their students though each profile would refer to a unique combination of references to the student's:

1. understandings (as in all points in the profile)
2. study skills (point 2)
3. ability/capability (3,4)
4. practical skills (3,4,6,7)
5. attitudes and values (3,5,7)
6. skills in thinking, including problem solving (all points).

The Student:

1 Has acquired a clear understanding of the content of major topics in the syllabus in geography.

2 Is capable of independent study from secondary sources such as maps, graphs and text. Reads with discernment and is skilled in notemaking.

3 Has the ability to undertake effective field studies as evidenced inthe quality fo field observations and records, while showing some reluctance to become involved with members of the community while doing field work.

4 Is capable of expressing ideas clearly both in speaking and writing; evidenced in well-organised written work and in lucid contributions to group discussions. Types at about forty words a minute with only a few errors.

5 Interprets and criticises decisions and actions underpinning current events, using concepts and skills from geography; is concerned about the conservation of natural resources and about disparities in the quality of human lifestyles round the world.

6 Is skilled in solving daily problems involving spatial elements.

7 Has a keen interest in travelling. Is a member of an orienteering club and turns in creditable performances in this activity.

Figure 10.1 A possible profile of a high school senior student's achievement in geography

Discriminating among these achievements is difficult if only because they are interdependent. As early as 1971, Klausmeier and Ripple were able to cite a comprehensive review of research to identify five important attributes of abilities and to begin distinguishing abilities from skills. They wrote:

"1. Abilities are a product of maturation and learning. Much practice and learning are required, for example, to speak French well or to comprehend the concepts and principles of biology. The stage of development of the individual limits what he can learn. Thus, abilities develop at different rates from birth through adolescence. For example, verbal comprehension develops much more rapidly than arithmetic reasoning in early childhood.

2. Abilities are enduring and relatively difficult to change in adults. For example, manual dexterity is quite stable from year to year; it is resistant both to improvement and deterioration in adulthood.

3. The present abilities of the individual affect the rate at which he learns new tasks. Thus, the student high in spatial ability and arithmetic reasoning achieves higher in physics than one low in both, motivation and other factors being equal. Equally important, the study of physics will probably contribute to the further development of both abilities.

4. One ability may transfer to the learning of a greater variety of specific tasks than another. Arithmetic computation, an ability, facilitates only the learning of new tasks involving computation, whereas spatial ability facilitates the learning of broad classes of tasks in mathematics, science, engineering, and other areas.

5. Abilities are more general and inclusive than skills. The term skill refers to the level of proficiency on a unitary task or a configuration of tasks. Diving, swimming, flying an airplane, playing basketball, writing cursively, and typing are skills acquired at varying levels of proficiency. In acquiring each of these skills, the individual learns a sequence of activities and executes them rapidly and precisely. Each skills however, can be described in terms of more basic abilities. Finger dexterity and finger speed are two of the more basic psychomotor abilities that underlie typing and handwriting; cognitive abilities are also involved." (Klausmeier and Ripple, 1971:74).

Many of the commonly-termed "geographical skills" (as identified in the Queensland geography syllabus) have a strong element of practical utility in that they are undertaken to contribute to some study. The performance of these skills sometimes requires manual dexterity or psychomotor coordination. It has been suggested (Fien et al., 1988) that varying proportions of motor skills and cognitive processes are involved in "geographical" activities. This is illustrated in Figure 10.2.

Highly skilled performances are built on assiduous practice. Motivation and the assignment of priority are inevitably involved but the development of skills extends well beyond motor coordination into cognitive and affective activity.

LOW		HIGH
MOTOR SKILL	• Problem solving in geography • Interpreting a map • Drawing a block diagram from data on a contour sheet • Drafting a map for a specific use • Drawing a cross section • Reading a map • Laying out a statistical table • Calculating ragients • Walking through a forest • Reading a rain gauge • Ruling a straigh line on a map The varying proportions of motor skills and cognitive processes in selected 'geographical' activities. The actural placement of the items may well vary from one individual to another.	COGNITIVE PROCESS

Figure 10.2 The various proportions of motor skills and cognitive processes in selected "geographical" activities. (The actual placement of the items may well vary from one individual to another.)

Recent thinking in the educational psychology of skill development

The ideas earlier quoted from Klausmeier and Ripple were written in 1971 but a search for more recent information revealed few significant index entries of skills in books about human learning. However, several themes centred on learning do recur in the literature of the 1980s.

One of the themes is a persisting concern with ways in which students go about learning and solving problems. There are frequent suggestions that students' approaches to learning become more complex as their learning progresses. At the same time, it is emphasised that learning can and should be made specifically appropriate to a task. Approaches to learning (say, skills or concepts) can be taught and learned. A second major theme is that the Piagetian stages of cognitive development are now interpreted as being more flexible than previously maintained. Varying levels of children's responses to specific tasks have increasing support over the rigid acceptance of the major stages in cognitive development. Another theme is that though knowledge about ability and memory is being refined, there is still much uncertainty about the development of human capacity to remember. A further theme stemming from recent research into cognition is that the existence of individual differences affecting learning as confirmed though the new emphasis is more on differences in the quality of processing ideas than the capacity to do so. These cognitive themes are related, and together can provide interesting applications to learning and teaching the skills used by geographers.

To a large extent these themes are brought together in the concept of metacognition. "Metacognition involves the monitoring and regulation of information processing strategies" (Lawson in Kirby and Biggs, 1980:145). The emphasis is on the knowledge that learners have about their mental processes and, their capacity to use this knowledge to guide their approaches to learning. In summarising professional applications of research into metacognition, Davidson (1987) wrote; "The focus of instruction in schools, for instance, has moved away from the inherent limits of the learner and has become the learner's ability to assess the nature and level of difficulty of an instructional task, the relative merits of various strategies for completing the task, preparedness to undertake the task or use a particular strategy and self monitoring of success".

Metacognitive processes gained from past learning experiences guide our approaches to effective future learning. By way of illustration Forrest-Pressley and Waller provide the following:

"The particular problem could be as simple as remembering a telephone number....Regardless of what the task is we proceed to monitor and regulate our activities. For example, we monitor when we ask ourselves whether or not we have rehearsed a telephone number enough to be able to remember it. We might even use a self test strategy (cover up the number and try to recite it) to check our progress. If we find that our goal has not been achieved, then we might again draw on our knowledge of alternative strategies in order to rectify the situation. For example, we might realise that we have too many things to remember for that particular day and resort to writing down the telephone number to reduce the load" (Forrest-Pressley and Waller, 1984:1).

The example helps make a case for the utility of metacognition for students' learning skills and for their teachers. Metacognitive approaches could well be crucial to learning how to learn. Other supportive evidence comes from O'Sullivan and Pressley, (1983); Meichenbaum and Asarnow, (1979); and Brown, Campione and Day, (1981). For them, metacognition refers to:

1. what learners know and can describe about the way they learn, and

2. the control they have over this knowledge by way of selecting from alternative strategies and then changing their approach to learning.

Metacognition implies active self-regulation and orchestration of behaviour in relation to the learning activity (Flavell, 1979; Reynolds and Wade, 1986). In Forrest-Pressley, (1985), Schneider reported research indicating that teaching general skills such as self-testing strategies (rehearsal, self-questioning) effectively produce transfer to other tasks similar to those in the training program. The earlier assertion that skills in geographical studies are essentially means toward further ends is not inconsistent with metacognitive principles. It should be possible to apply these principles to learning the diverse skills needed by students of geography.

From teaching to learning skills

1) Teaching skills

Long-established approaches to the teaching of skills are described in Klausmeier and Ripple (1971: 476-515) and Chapin and Gross (1973). According to them, skills are acquired as students engage in understanding, organising and perfecting. These terms are elaborated as follows.

a) Understanding

It is widely agreed that understanding contributes to the acquisition of skill. It helps people to learn a skill when they know much about it, including such things as the kinds of co-ordination needed to put it into practice, who can provide exemplary performances in a demonstration, and why it can be useful to, or valued by, persons. It is claimed, for example, that understanding the concept "climate" contributes meaning to anyone drawing a climatic graph. Knowledge about skills may be acquired

PRINCIPLES	PROCEDURE
1 Many skills used in geography are complex and can be broken into components, for example, drawing a map involves drafting, lettering, shading and other operations	Make a task analysis of the skill to identify its components. Find out about the readiness of students to undertake each component task. Help students experiencing difficulty.
2 It helps students starting to learn a skill if they watch a good demonstration.	Students should be able to see the demonstration clearly. Demonstrate the whole, then the parts, then the whole again.
3 A commentary on the demonstration and/or a written plan of the seqence of actions helps people learn skills.	Teachers should give a commentary as they demonstrate; and provide guiding notes or require students to record their own notes.
4 Opportunities for supervised practice shortly after the demonstration help learners to minimise errors and refine their actions.	Teachers should allow time for practice straight after the demonstration. If the skill is complex, the demonstration plus practice should be applied in turn to sub-skills.
5 Comments on their performance during the practice help students organise the skill.	Teachers should provide comments on the work of individual students.
6 Application and use of skills improve their meaningfulness and make them more easily transferred to other tasks.	Devise several ways of practising the same skill, and build it into more complex operations like problem-solving.
7 The capacity to evaluate one's own performance can be used to improve the skill.	Help students formulate criteria of good performance and encourage self-analysis.

Figure 10.3 Model 1. Teaching skills to school students (Cox, in Fien et al., 1988)

TASK ANALYSIS	TEACHING PROCEDURE
1 Note precisely the uses to which the section will be put as a guide to (a) choosing the line of section, and (b) deciding the vertical exaggeration.	Teachers and students discuss how the section will be useful in the study they are making. They also discuss the effects of using different vertical exaggerations.
2 Mark the line of section on the map or on an overlay, to the map.	Teacher demonstrates; students undertake the task individually; teacher checks their work before going on.
3 Draw axes for the section.	Teacher demonstrates on overhead projector or chalkboard. Students undertake the task individually. Teacher checks.
4 Decide horizontal scale, (usually same as map), vertical scale. Calculate vertical exaggeration.	Teacher explains why they should choose the map scale as the horizontal scale of the section. Formula for calculating vertical exaggeration on chalkboard; applied to this section.
5 Gather data about altitude of points along the section by noting where the contours cross the line of section. This is usually done by putting a piece of paper along the section and marking the points on it. Where the same contour recurs successively, the symbols and are used to indicate valley or hill between the contours.	Teacher demonstrates on the overhead projector or the chalkboard. The demonstration is for the whole section and is accompanied by a commentary. Where the same contour recurs the teacher explains how to recognise whether they represent valley or hill. Students then given opportunity of making this decision for themselves. Students mark points on the paper, noting altitude at each point. Teacher checks their work.
6 Plot the points which will be joined to make the section. Ensure accuracy on both scales.	Teacher demonstration. Student application. Teacher supervision. As above.
7 Join the points to form a smooth curve. Estimate the depth of valleys and height of hills where the same contour recurs.	Teacher demonstration. Student application. Teacher supervision. As above.
8 Note the annotations to the section, i.e., the scales, start and end points of the section, vertical exaggeration, title.	Teacher demonstrates how and where these are noted on the section. Student application. Teacher supervision.
9 Use of the section for the purpose for which it was a study of relief and slope in area, to determine intervisibility, to provide the base diagram for a transect, to help make decisions about future land use.	These applications may be undertaken in different ways, but usually require supervision by teachers in the first instance. Teacher-led discussion, or inquiries structured by teachers are appropriate.
10 Students should be given the opportunity of judging the accuracy and usefulness of their own sections.	Teacher and student devise criteria by which to judge accuracy. Students apply these. Revision questions by teacher focus on the uses of the section.
11 The teacher should provide opportunities in future learning situations for the students (i) to practise drawing sections and making inferences from them, and (ii) to decide for themselves that sections are an appropriate technique to adopt in some study being undertaken.	

Figure 10.4 Drawing a cross-section: an example of teaching a skill (Fien et al., 1988)

in many ways including watching a performance of the skill, listening to a description of it, or reading about it.

b) Organising

This phase involves people acquiring skills in preliminary explorations, developing coordination, reducing errors and improving performance. The emphasis is on dexterity rather than understanding though the two cannot entirely be separated. Practice enables us to undertake many skills, such as driving a motor car, without self-conscious thought. But an unexpected event on the road immediately consumes our attention and conversation with a passenger is temporarily put aside.

c) Perfecting

Perfecting involves repeated use of the skill. Improvement in the quality of the performance during perfecting normally requires improved knowledge and organisation as well. Studies in human movement indicate that attention must be paid to each individual part of complex actions in order to facilitate the process of perfecting. Athletes, such as a diver from the high springboard, regularly visualise the entire sequence of actions just before making the dive.

The three phases have been brought together in traditional models of teaching skills to young learners. In model 1 (Figure 10.3) principles and procedures 1, 2 and 3 relate mainly to understanding, 4 and 5 to organising, and 6 and 7 to perfecting skills.

A detailed application of model 1 is presented in Figure 10.4. It comes from the same source and illustrates the procedures that teachers might use in showing students how to draw a cross section.

2. Learning skills

Metacognitive principles provide guidelines for people wishing to learn how to learn. Planning, remembering and self-monitoring are aspects of metacognition that apply to the acquisition of skills such as those used by geographers. Metacognitive principles guiding skills development emphasise making descriptions of one's own processes of learning and using these descriptions to help make decisions about how to proceed with the learning. The following section of the paper explores the possibilities of applying metacognitive principles to learning skills in geography. Model 2 (see Figure 10.5) illustrates the application of metacognitive principles.

3. Metacognitive approaches to learning how to read and interpret maps

In general, these approaches are aimed at helping students to become more keenly aware of the skills they are learning and to improve their strategies for learning. For example, improvement may result from:

1. noting the title and perusing the legend of the map,
2. thinking about the content shown by the map before using it,
3. pausing during study of the map and asking just what has been learned from it so far, and
4. paraphrasing what the map "says"

Students may learn how to monitor their own learning from a map when they are encouraged to ask such questions as:

1. Why have I chosen to use this particular map?
2. What do I find to be most difficult in reading this map?
3. What can I learn from specific symbols on the map and from the ways in which they are combined?
4. What does the title tell me about the map?
5. What is there about the way the map is presented that tells what is the most important thing it shows?
6. What part of the map did I read first?
7. What part of the map have I neglected?
8. What parts of the map did I go back over and study again?
9. What shall I do if there is something I do not understand?
10. What did I find easiest about studying this map?

Questions such as these might be asked by students while undertaking the nine steps in the model 2 of skill learning.

The roles of teachers in such a learning setting include:

1. making students aware of such questions and of the value of asking them, and
2. observing students at work and offering comments (on request by students) on how they as teachers see the students' progress.

Support for metacognitive principles of learning comes from Paris et al., (1986). Their research evidence relates to the use of similar questions to promote children's reading. They concluded that children developing reading skills benefit from knowing what are the appropriate strategies, how they operate, when they should be applied, and why they are useful.

The essential difference between model 1 and model 2 lies in the shift in emphasis from teaching to learning. Skill development becomes a matter of learning how to learn in model 2 which is based on metacognitive principles. The larger element of discovery is likely to bring to skill development the advantages of meaningfulness and motivation usually attributed to finding out for oneself. The metacognitive model makes no specific reference to demonstration and supervised practice. These tend to give control of the skill learning to the teacher rather than the learner. Nevertheless, people learning skills in a "metacognitive" way may well ask for demonstrations and supervision, for example, in association with steps 2, 3, 4, 7 and 8 in the second model.

It has been noted that the major phases associated with the acquisition of skill are understanding, organising and perfecting. The metacognitive approaches just described and exemplified in the case of map reading are mainly associated with organising because they help learners explore their own performances with a view to improvement. Metacognition provides further information about how learners can proceed to organise what they know about their own performance of the skill. This view is shared by Paris et al., (1986: 121) who wrote "In our view metacognition is an intermediate goal in development, learning and classroom intervention."

Skills as part of learning units (topics) in geography

Learning units in geography should contribute to achieving the rationale for including this subject in the school curriculum. The units should contribute to the students' developing competence in their life roles. As geography units they should relate to education

1. about people in places,

2. for human welfare, and

3. in real social contexts.

They should also contribute to education about, for, and in environments. Elaborated, the last two sentences assert that geographical education involves:

1. knowledge about the world's people,

2. education aimed at student understanding and valuing associated with the patterns, causes and issues of the lifechances and lifestyles of people round the world, and

3. learning with other students, and learning in community contexts outside the school gates.

Similarly, environmental education involves:

1. knowing about the environment, that is, understanding ecological settings,

2. learning to make decisions about environmental protection and the judicious use of resources, and

3. learning in the field.

Learning units in geography should be supportive of this rationale for including geography in the school curriculum. If they are to be truly learning units, their structure should be guided by metacognitive principles and should also involve students in making decisions. So the overall model of a learning unit in geography may well take the following forms (Figure 10.6) (Cox, 1987:76).

Conclusion

Recent publications in Australia, U.S.A. and Britain support the view that skills in school geography are perceived as being mainly associated with practical activities. However, there is common agreement that close links exist between the practical work and student understanding.

Traditional methods of teaching skills in geography to school students have tended to emphasise the activities of teachers as they foster skill acquisition and give importance to understanding, organising and perfecting the skills (Model 1). More recently, the emphasis has moved away from the teacher to the activities of the learners as they acquire and use skills (Model 2).

The change in focus from the activities of the teacher to those of the learner stem largely from:

1. A rationale for including geography in the school curriculum. The rationale is based on the present and future life roles of students and their need to develop skills in observation and in recording and interpreting data, to make decisions, and to report and act on their findings.

2. Recent developments in cognitive psychology with particular reference to metacognition. Metacognitive approaches to learning emphasise individual ability to remember, to plan and organise, to process information and to monitor one's own progress. These approaches involve learners in making use of principles that apply to the acquisition of skills.

It is proposed that geography learning units which combine the functional view of skill acquisition and metacognitive principles of learning encourage increased attention to student learning and the development of student autonomy and self-learning as they practise skills in their studies and engage in or prepare for their life roles.

Case studies and applications

It would take a separate volume of commissioned papers to give examples of strategies for developing all possible specific skills and abilities. The case studies in this section are representative of isolated strategies or sequences of these strategies that are in use in geography classrooms around the world. The major omission in the examples of specific strategies concerns the development of thinking skills. The first group of examples focuses on the development of mapping skills; the second

PRINCIPLES	PROCEDURE/EXAMPLE
1 Motivation is a basic condition for effective learning of skills and for sustaining autonomous learning.	The motivation may well be provided in geography when the skill is needed to enable the present inquiry to be pursued further, e.g. calculation of gradients is needed in a project involving plotting the routes for a railway and a highway across a mountainous area.
2 Learners should know about the principles on which the skill rests.	The development of skill in drawing maps is related to understanding the nature of maps, for example, how they may be drawn to represent different levels of accuracy in distance, area, shape and directions as required by the specific uses for which the map is designed.
3 Learners should understand the practical aspects of the skill.	This involves knowing what bodily coordination is needed to undertake the skill activity, for example, keeping the eyes open and reading the graduated scale while using a clinometer.
4 Learners need to be able to appraise different strategies for completing the task and to choose among them.	The task may require the representation of population distribution on a map. The decision as to whether to use choropleths, dots, proportional circles or proportional spheres will be made on the basis of the character of the data and the uses of the map. Proportional spheres, for example, are useful where extremes of density have to be shown.
5 Learners should try one of the strategies; provide their own commentary on what they are doing, describing what is being learned and how the learning is happening.	The commentary is aimed at making the learners clearly aware of their actions and how they contribute to the accomplishment of the skill. This is comparable to the use made by athletes of video-recordings of their own performances.
6 Self-monitoring of the learning is important. Learners should set up criteria by which to judge the success of their performance.	The capacity to establish criteria is often associated with knowledge related to the skill. Self-monitoring fosters the developing autonomy. Procedures 4, 5, and 6 are elaborated in the example following model 2.
7 Persistent rehearsal is required along with continuing evaluation.	Rehearsal is part of perfecting, but rehearsal alone may not produce improved skill, for example a person's handwriting may actually deteriorate even when this skill is frequently used.
8 The approach to developing the skill should be changed in the ligh of what is learned from the evaluation.	This illustrates the close link between cognition and practical skill development, as noted earlier in the paper.
9 Continued self-questioning about the skill will enhance its transferability.	Improved understanding and experimentation increase the likelihood of learners being able to use their skills in diverse settings.

Figure 10.5 Model 2. Skill learning by school students

concentrates on the development of social skills and the final group demonstrates sequences of lessons that illustrate how a series of skills and abilities may be organised logically into useful curriculum units.

The first group of three studies focusses on different facets of mapping skills.

JOOP VAN DER SCHEE reports on a Dutch study that investigates the extent to which secondary students use geographical concepts in analysing maps. The results of the study suggest that there is a need to give more attention to develop map analysis skills, especially the use of maps showing spatial systems, in geography teaching.

BENGTECK LIAW conducted a study in a Singapore secondary school to examine the effects of practical experience and sequential skills on students' achievement in map reading. He found that students who followed a hierarchical sequence and a practical approach to map reading performed better than those who didn't.

TROELS RAADAM adopted a different approach to the development of mapping skills by focussing on the ways by which textbooks and atlases introduce and develop aspects of map use. He developed a scheme for analysing these approaches and shows how it may be applied to a range of Danish examples.

The second group of two papers places a focus on the development of social skills.

LOUIS MURRAY, through a focus on interactive teaching styles, shows how a social approach to problem-solving, self-directed analysis, free discussion and decision-making can be used to model people who live in the areas studied. Through these teaching styles, students are enhanced to develop a range of social skills in different environmental situations.

DAVID BOARDMAN uses the strategy of a simulated public inquiry as a strategy for improving students' decision-making skills. He does so via a case study in the U.K. where a large industrial plant is located near to an area of high landscape quality.

STAGES	LEARNING EXPERIENCES (including skills)
1 Recognising the context, that is, the occasion, situation, issue or problem requiring some decision prior to action.	• observing people and events (e.g. as reported in the newspaper); • analysing the situation; • interacting with others (e.g. by asking questions about or discussing the matter).
2 Acquiring knowledge on which to make the decision and awareness of the value bases of the information.	• finding information; • reading and comprehending books, journals, newspapers, etc.; • interpreting graphs, diagrams, numbers, cartoons, maps, etc.; • using the resources of the community; • analysing values.
3 Establishing values and priorities associated with the matter requiring a decision.	• devising criteria; • ordering the alternative decisions; • probing for values premises of alternate courses of action; • considering who decides and for whom.
4 Studying, reflecting on and ordering the possible decisions, either individually or as a member of a group.	• using logical and critical thinking skills; • recognising consequences; • accepting responsibility; • applying criteria to make judgements; • considering several viewpoints on the topic; • cooperating with others making decision.
5 Deciding and acting on the decision.	• feeling confident about the decision; • taking appropriate action.
6 Reviewing consequences of the decision and the action(s) after the event (where practicable).	• finding out about the effects of the decision and actions on others; • reviewing the effects on self.

Figure 10.6 An outline structure of a learning unit in geography

The final two studies report on the development of sequences of lessons to demonstrate how the development and application of selection skills may be implemented in geography lessons.

GOSTA WENNBERG reports on a sequence of lessons he has developed for Swedish students to develop their understanding of deserts involving problem-solving skills using maps and inquiry methods. This sequence of four lessons shows how these skills may be implemented in a guided-inquiry approach.

ERISA KYAGULANYI develops another sequence of activities to develop Ugandan secondary students' understanding of peasant farming. In this sequence the students learn to apply a range of conventional geographical skills including the use of photographs, maps and valuing strategies.

REFERENCES

Board of Secondary School Studies, Queensland (1978) *A Review of School-Based Assessment in Queensland Secondary Schools*, Brisbane.

Board of Secondary School Studies, Queensland (1987) *Junior Syllabus in Geography*, Brisbane.

Brown, A.L., Campione, J.C., & Day, J. (1981) "Learning to Learn: On training students to read from texts", in *Educational Researcher*, 10, (2), 14-21.

Chapin, J.R. and Gross, R.E. 1973, *Teaching Social Studies Skills*, Little, Boston, Brown & Co.

Cox, B. (1987) "Skills Teaching in Social Studies", in March, C.J. (ed.), *Teaching Social Studies*, Sydney, Prentice-Hall of Australia, 69-94.

Davidson, G. (1987) "Professional Applications of Research into Metacognition" in *Professional Psychology Abstracts, Supplement to APS Bulletin*, 4(2) April, The Australian Psychological Society, Parkville, Victoria.

Department of Education and Science, 1979, *The Teaching of Ideas in Geography: Some Suggestions for the Middle and Secondary Years of Education*, A discussion paper by some members of H.M. Inspectorate of Schools, H.M.S.O., London.

Fien, J., Gerber, R., & Wilson, P. (1988) *The Geography Teacher's Guide to the Classroom*, Melbourne, Macmillan.

Flavell, J.H. (1979) "Metacognition and cognitive monitoring: A new area of cognitive - developmental enquiry", *American Psychologist*, 34, 906-911.

Forrest-Pressley, D.L., & Waller, T.G. (1984) *Cognition, Metacognition, and Reading*, New York, Springer - Verlag.

Forrest-Pressley, D.L., MacKinnon, G.E. and Waller, T.G. (eds.) (1985) *Metacognition, cognition and human performance*, Vols. 1 and 2, New York, Academic Press.

Irving, A., (ed.) (1982) *Starting to Teach Study Skills*, London, Arnold.

Joseph, Sir K. (1985) "Geography in the School Curriculum", *Geography*, 70(4), 290-298.

Klausmeier, H.J. and Ripple, R.E. (1971) *Learning and Human Abilities*, New York, Harper and Row.

Lawson, M.J. (1980) Metamemory: "Making Decisions about Strategies", pp. 145-160 in Kirby, J.R. and Biggs, J.B. (eds.) *Cognition, Development and Instruction*, New York, Academic Press.

Macquarie University (Delbridge, A., et al.) (1985) *The Macquarie Dictionary*, South Australia,Griffin Press.

Meichenbaum, d., & Asarnow, J. (1979) "Cognitive - behaviour modification and meta-cognitive development implications for the classroom", in Kendall, P.C. and Hollon, S.D., (eds.), *Cognitive Behavioural Interventions: Theory, Research and Procedures*, New York, Academic Press.

National Council for Geographic Education, Task Force (1984), "In search of a scope and sequence for social studies", *Social Education*, 48(4), 249-263.

Paris, S.G., et al., 1986, "A Metacognitive curriculum to Promote Children's Reading and Learning", *Australian Journal of Psychology*, 38(2), 107-123.

Reynolds, R.E. and Wade, S.E., 1986, "Thinking about Thinking about Thinking: Reflections on Metacognition", *Harvard Educational Review*, 56, 307-317.

Williams, M. (1985) "The Geographical Association and the Great Debate", *Geography*, 70(2), 129-137.

11: THINKING GEOGRAPHY WITH MAPS

Joop van der Schee

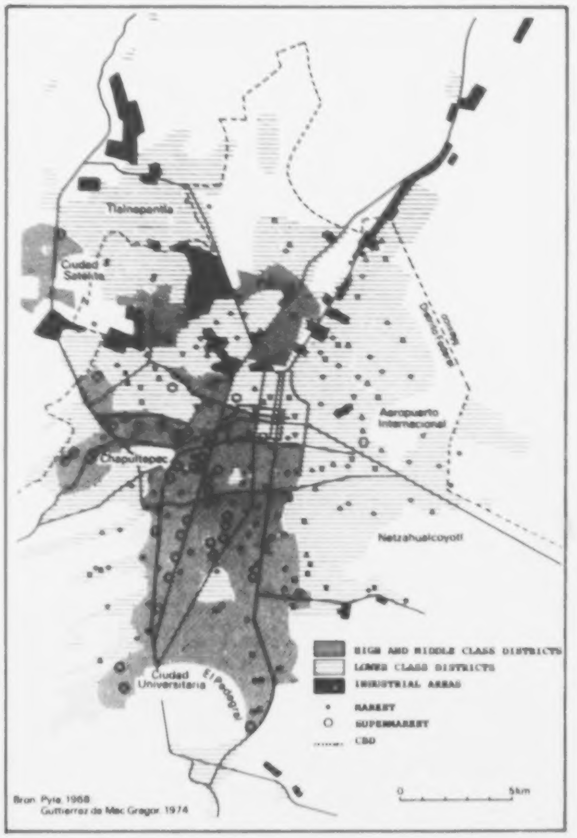
In most Dutch geography schoolbooks a lot of conceptual knowledge is presented to the students. However, a systematic training in acquiring and using that knowledge by means of concepts derived from geographical method seems to be missing. Since 1975 educational geographers in the Department of Human Geography at the Free University of Amsterdam have developed geography curriculum projects for primary and secondary education to show how students can learn the geographer's way. In accordance with Bruner's views on curriculum organization, discovery methods and problem solving are used in these projects. Their most important characteristic is that key organising concepts belonging to the discipline of geography such as spatial distribution, spatial association and spatial interaction are seen as leading to a stepwise process of knowledge accumulation about the world we live in. (Graves, 1984) Questions about the contribution of geography courses in secondary education to the development of geographical skills led to the investigation reported here. It deals with the ways in which students and teachers in secondary education use geographical cognitive skills when they analyze maps. The results of three questions from a major research study (Van der Schee, 1987) will be summarised. The questions are:

1. To what extent are students in their fourth year at grammar school able to employ a range of concepts derived from the geographical method when they analyze maps?
2. Can these skills be augmented by exposing students to specially devised programmed instruction?
3. To what extent do teachers who are entrusted with the geographical education of grammar school students themselves possess these skills in analyzing maps?

1. The map anaysis skills of students

Over 200 students between the age of fourteen and seventeen from five grammar schools in the Netherlands participated in the research. These students can be expected to employ certain geographical skills when analysing maps after three years of geographical training. One of the research questions is to find out to what extent this assumption is true. The investigation was limited to the skills of students in problem solving by way of map analysis. Geographers avail themselves of two complementary ways of looking at phenomena. Maps are the tool through which geographers obtain information about the site as well as the situation of phenomena. The recognition of spatial distributions is the first step in map analysis. The recognition of spatial relationships is the second step. Spatial relationships are either vertical relationships (relationships between phenomena in one locality) or horizontal relationships (relationships between localities). Each approach employs specific fundamental geographical concepts.

Students' map skills were measured by map analysis tests in real-life classroom situations. Some of the main assignments deal with vertical relationships (subtest A: spatial association) and others with horizontal relationships (subtest B: spatial interaction). Figure 11.1 shows one of the underlying maps used for the map analysis tests.



Bron: Pyle 1968
Gutierrez de Mac Gregor 1974

Figure 11.1 One of the maps used for the map analysis tests.

Asking students to locate a new supermarket in Figure 11.1 and state their reasons for it, gives information about their skill in employing the basic concept spatial association. The maps in the tests were made unrecognizable to avoid the influence of knowledge which students already have of an area.

The research was conducted according to an untreated control group design with pre-test and post-test. Apart from the pre-test and the post-test, it also included a retention test and student variable test. The pre-test and the retention test were identical. The post-test differed from the pre-test in that the factual information offered in the map analysis assignments was different. However, the same concepts derived from the geographical method recurred in the assignments of both the pre-test and the post-test. The results of the pre-test map assignments can give some information about the first research question. Comparing the results on the pre-test with those on the post-test and the retention test gives some information on the second research question.

	pre-test		post-test		retent. test	
	A	B	A	B	A	B
Exp. group	64.78	37.87	63.25	64.88	67.25	62.00
Contr. group	65..39	40.24	57.65	44.79	66.58	50.45

Figure 11.2 Average scores on map analysis tests

Figure 11.2 shows the average score on the three map analysis tests in both groups. At the pre-test the students involved in the investigation scored significantly higher on assignments dealing with vertical relationships (subtest A) than on assignments dealing with horizontal relationships (subtest B). With respect to the second research question, it can be reported that the average post-test and retention test progression of the students in the experimental group were significantly higher than those of the students in the control group. In addition, the students who made the programmed instruction about analyzing maps demonstrated a significantly higher post-test and retention test score progression for subtest B than for subtest A. Of the independent variables, the student attribute "non-verbal reasoning" showed the strongest correlation with the pre-test score. Students with a low pre-test score attained the highest post-test and retention test progress score after having gone through the instruction sessions. This substantiates the conclusion reached by other researchers (e.g. Snow and Lohman, 1984) that students with low pre-test scores benefit especially from a well-structured form of instruction.

The research results suggest that it may be desirable to give more attention to the development of map analysis skills in geography teaching. More specifically, students ought to be trained in the use of maps that depict spatial systems, because in order to gain insight into the spatial structure of present-day society, it is essential to be able to detect interaction patterns within and among areas.

2. The effects of programmed instruction

After the hey-day of the fifties, programmed instruction fell into oblivion for a long time. Nowadays, there is a renewed interest for it through computer assisted learning. Programmed instruction can be useful for a change from other teaching methods provided that it is not used too often. This is especially so if individualised instruction is pursued.

At the start of the investigation it was still unknown which teaching method would be best suited to which type of student. This led to the selection of a method which was differentiated internally. In order to minimise the impact of the teacher, a tree-like programmed instruction was adopted. Remedial loops with assignments at a different level are included to help students who fail to answer particular questions. The programmed instruction of the investigation invites the students to analyze the transportation situation of an imaginary country in order to improve it. While carrying out this assignment, the students discover how the application of concepts that are related to the geographical method generates insight into the problem. The instructional materials consisted of two books: one with maps and one with texts and assignments. Figure 11.3 shows one of the maps of the programmed instruction. Students have to discover that the number of phone calls is greatest between towns which have more inhabitants and/or between which distances are shorter. If students fail to do so, they are given assignments which require

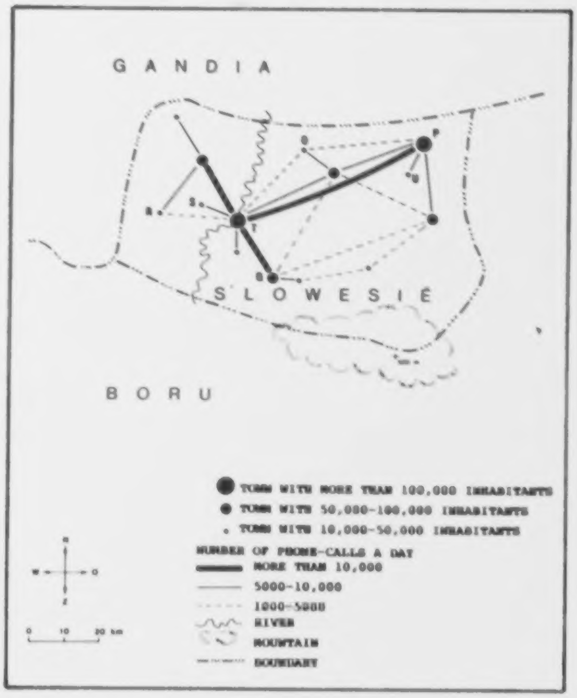

GANDIA
SLOWESIE
BORU
P
Q
R
S
T
TOWN WITH MORE THAN 100,000 INHABITANTS
TOWN WITH 50,000-100,000 INHABITANTS
TOWN WITH 10,000-50,000 INHABITANTS
NUMBER OF PHONE-CALLS A DAY
MORE THAN 10,000
5000-10,000
1000-5000
RIVER
MOUNTAIN
BOUNDARY
N
W
O
Z
0
10
20 km

Figure 11.3 One of the maps used for programmed instruction

them to analyse the spatial interaction between some specific towns in one of the nodal regions presented on a separate map. Town P would represent such a nodal region.

Three lessons were planned for programmed instruction. The topic was introduced to the experimental group of one hundred students. In each of the five schools involved in the investigation, one class served as the experimental group, while a parallel class was assigned the function of control group.

An analysis of the route that the students chose suggests that the programmed instruction facilitates a deeper understanding of the geographical concepts that the students can handle. A questionnaire was designed to determine the opinion of the students about the programmed instruction lessons. The responses revealed that most students enjoyed working with the instruction materials even if only as a change of routine. Most students rated the materials as neither difficult nor easy. Further study revealed that the choice of circuitous route rather than the shortest route through the programme, commonly occurs when the students are asked to apply geographical cognitive skills in which they had no prior training. Figure 11.4 shows the paths taken by students who worked on the assignment about telephone-traffic in Slowesie. Most students chose the remedial loop from assignment number 27A via 31B and 27B to 29B, because they overlooked distance-decay in the first instance. However, the number of times that a student drifted from the shortest path did not affect the post-test and retention test progress scores. Students who made many misjudgements did not have a score significantly different from those with few errors of judgement.

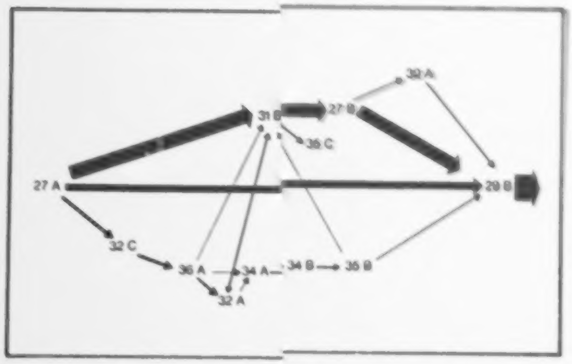


Figure 11.4 The paths taken by students who worked on the telephone-traffic in Slowesie asignment.

3. A comparable investigation among teachers

A third research study was designed to answer the question to what extent the teachers who are entrusted with the geography education of grammar school students themselves possess the geographical cognitive skills in analysing maps. One of the map analysis tests administered to the students was also completed by 43 randomly selected fully qualified teachers of geography. In addition, personal characteristics of these teachers were ascertained by means of a questionnaire. The results show that many of the students, have difficulty using a number of concepts derived from the geographical method when analyzing maps. Likewise, the teachers have the greatest problems when asked to recognize horizontal relationships (see Figure 11.5).

	students (n = 203)		teachers (n = 43)	
	x	st.d.	x	st.d.
subtest A	65.09	25.50	64.54	29.87
subtestB	39.07	16.60	43.87	21.05
total	49.48	15.38	52.25	19.21

Figure 11.5 The results of a map test given to both students and teachers

The variation between the teachers is related to their previous academic training: the variant of course of study they chose is the only teacher attribute that correlated significantly with the scores obtained in the map analysis test. Among the group of 43 geography teachers, the 20 who specialized in educational geography in university or gained their qualifications through teacher training courses in this field achieved a significantly higher total score on the map analysis test than the other teachers (t=2.41 and p=0.02). The explanation of this difference must await further research. The results of the investigation among the teachers are remarkable. If teachers are not trained in structuring the world in a geographical way, how can we expect their students to do so? There is some reason to doubt that the training of geography teachers is entirely satisfactory. Most students in teacher training have a lot of problems in developing geography lessons in which the geographical method is used to transform the knowledge gathered by the geographical science into an attractive and useful entity for school use. Teacher training is often focussed on the transfer of already structured information. More attention should be paid to teaching methods which help pupils to apply concepts derived from the geographical method to discover regularities and variations in areas they or others are living in.

Evaluation

Information becomes obsolete very soon in modern society. Geography can be a very engaging subject if it teaches students how to acquire knowledge about the dynamic mosaic of regions in the world. Describing and interpreting spatial distributions and spatial relationships within and between areas is the core of the geographical method. Maps are indispensable in these activities. Maps are more than nice illustrations. Maps give food for thought. If students are trained in map analysis - map reading is prerequisite to map analysis - they have the disposal of a lot of data and patterns in one view, without having to read many pages. Map analysis enables students to structure regions by means of site and situation characteristics which are not shown by texts or statistics. The map, which is geography's pedagogical strength, has been relegated to a secondary role in the classroom and in the basic texts, wrote Picker in 1971. It is questionable that things have changed a lot since.

Considering the results of the reported investigation and the importance of relations between areas for the spatial organization of today's world, it is necessary to develop curriculum projects which focus on horizontal relationships as well as vertical relationships. An example is the Dutch project "The world around the U.S." (Hoekveld-Meijer et al., 1982). In this project students learn about world systems by means of mapping the characteristics of countries and the spatial interaction between them. The resulting spatial patterns provide a conceptual framework for students to understand text such as:

"Each day two 20,000-ton freighters loaded with grain leave the United States for the Soviet Union. The flow of grain between these two major adversaries, something neither government had planned on, is influenced by economic considerations such as the size of the Soviet grain deficit, the U.S. capacity to supply and the Soviet ability to pay. Political considerations include the risk to both trading partners associated with being heavily dependent on each other, whether as a supplier or a market" (Brown, 1982: 30).

For students to achieve a real understanding of the extent and type of grain-growing in North Dakota it is not sufficient for them to know something about climate and soils. Trade patterns must be taken in account too. What happens on a world scale influences what happens on a micro-scale and vice versa.

If map reading skills are to be developed as a means of helping students to develop geographical understanding, geography teachers have to ask the following questions:

1. Do students map data?
2. Are complex (topographic) maps reduced to simple thematic maps?
3. What can be said about the spatial distributions on the map (e.g. density, dispersion)?
4. Are there spatial associations (formal regions)?
5. What can be said about spatial interaction (e.g. direction and size of interaction, nodal regions)?
6. Have students been working with maps of different scales?

This list is not exhaustive, but it gives some idea of the map analysis skills which are necessary to be able to interpret maps. The study of spatial distributions and spatial relationships is considered to be the essence of the geographical approach within an empirical-analytic view of scientific methodology. Geographers do it with maps.

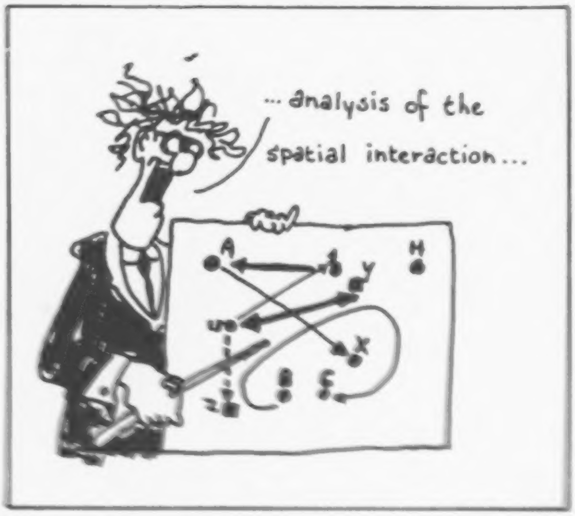

... analysis of the spatial interaction ...
A
H
Y
X

Figure 11.6

REFERENCES

Brown, L.R. (1982) *U.S. and Soviet agriculture: the shifting balance of power*, Washington D.C., Worldwatch Institute.

Garreau, J. (1981) *The nine nations of North America*, New York, Avon Books.

Graves, N.J. (1984) *Geography in education*, London, Heinemann.

Hoekeld-Meijer, G. and J.A. van der Schee (1982) *De wereld rondom do V.S.*, Amsterdam, Vrije Universiteit.

Picker, R.D. (1971) "Geography and the learning process", in: J.M. Ball et al. (eds.), *The Social Sciences and Geographic Education*, 164-171, New York, Wiley & Sons.

Schee, J.A. van der (1987) *Kijk op kaarten*, Amsterdam, Vrije Universiteit.

Snow, R.E. and D.F. Lohman (1984) "Toward a theory of cognitive aptitude for learning from instruction", *Journal of Educational Psychology*, 76, 347-376.

12: EFFECTS OF PRACTICAL EXPERIENCE AND SEQUENTIAL SKILLS IN MAP READING

Liaw Beng Teck

Until 1980, map reading was not taught in the lower secondary schools in Singapore. The assumptions were that map reading was unnecessary and even if it was taught children would not understand maps anyway, so there was no point in teaching about them. However, in recent years in Singapore, education has undergone major changes in terms of structure, contents and approaches. One of the new features in geographical education is that map reading is now taught to students in the first year of secondary school (aged 12+), instead of in the fourth year (aged 15+). This change is based on research findings in psychology and learning theories which suggest that children can learn map skills earlier if the teaching is based on a systematic, hierarchical curriculum structure (e.g. Adkins, 1981; Hill, 1984).

Although it is often accepted that map reading can begin earlier than 12+, many geography educators hold different views as to how the curriculum should be structured and what teaching methods would be most effective in helping children acquire such skills. This has prompted the author to re-examine the separate and combined influences of curriculum structure and teaching procedures on the achievement of map skills. The curriculum structure is under-pinned by Gerber and Wilson's (1984) suggested sequence of map skills instruction. According to Gerber and Wilson, teachers should look at maps as a form of communication, and, building upon this, teachers should present a sequence for introducing map skills to pupils. Such a sequence might be: plan view, arrangement, proportion and map language. The present study proposes the following as key elements for sequential instruction: orientation and direction, location and reference system, distance and scale, and symbols. These elements are first treated discretely and then integrated to form a logical sequence for the understanding of contours and the reading of maps. These map skills are considered to proceed in stages of increasing difficulty, which form a hierarchy with lower abilities as prerequisites for the subsequent higher abilities.

Many authors in geographical education, (e.g. Boardman, 1974; Graves, 1982; and Walford, 1981) have advocated practical learning approaches in teaching geography. It has also been found that practical experience or fieldwork not only facilitates learning but also improves retention of related geographical concepts and map skills (Mackenzie and White, 1982). It follows that practical experience and a hierarchical sequence of map skills instruction is likely to help pupils progress more effectively in the acquisition of map skills, although there is insufficient evidence to conclude that a non-hierarchical sequence and direct-teaching approach will be less effective.

The findings of this study may therefore answer some of the questions concerning the effects of curriculum structure and teaching methodology on map skills achievement amongst first year secondary pupils in Singapore.

The hypotheses tested were that:

1. pupils who are taught map skills using the hierarchical sequence combined with practical-learning approaches may perform significantly better than those using the non-hierarchical sequence and direct-teaching approach; and

2. pupils who are taught map skills using the hierarchical sequence combined with practical-learning approaches may have a significantly better retention rate than those using the non-hierarchical sequence and direct teaching approaches.

1. Design of the research

The research was a quasi-experimental 2 x 2 factorial design with multiple treatments. In this inquiry, four treatment groups were used in order to consider the two important aspects of practical experience and curriculum sequence. The treatments were as follows:

Group One - used a hierarchical sequence of curriculum structure with a practical-learning approach to map skills instruction.

Group Two - employed the same hierarchical sequence but this was combined with a direct-teaching approach.

Group Three - had no specific sequential structure and was combined with practical-learning approach.

Group Four - also used the non-specific structure but this was combined with direct-teaching approach.

The subjects were drawn from New Town Secondary School, Singapore. Initially, four intact classes of 153 pupils at first year secondary level (aged 12+) were involved in the experiment. Later, six pupils did not complete the experiment either due to transfer or withdrawal. Three other pupils were then randomly dropped for final analysis to maintain equal cell size of 36 pupils each, with equal numbers of boys and girls. The four intact classes were randomly assigned to one of the four treatment groups.

The experimental procedure was carefully constructed to fit into the ongoing school programme with minimum disturbance to normal curricular activities. Care was also taken to adhere to the time allocation of 2 x 35 minutes of teaching per week. The lessons were taught by the same teacher to eliminate differences caused by intervening variables such as teacher personality, qualification and experiences, etc. Throughout the experiment, all pupils in the four treatment groups received the same instructional materials, while the curriculum structure and teaching methods were varied. The materials to be learned consisted of eight sub-units of map skills instruction as stipulated in the new geography syllabus. One unit was covered each week. Though the teaching programme covered only eight weeks, the whole experiment took ten weeks to complete. The first week was for introduction and pre-test, and the tenth week was for revision and post-test. The administration of the retention test was conducted two weeks after the completion of the post-test.

Data were obtained from the pre-test, post-test and a delayed posttest for analyses. The general linear model procedure (SAS Institute Inc., 1982) for analyses of variance (ANOVA) was performed. Group comparison of means were subsequently considered by using Tukey's studentised range (HSD) test. All hypotheses were tested at the .05 level of significance.

In order to avoid possible problems related to the administration of the tests and also where necessary, to enable improvements on the reliability and validity of the questions, a pilot test was carried out at Outram Secondary School, a school similar to the one in which the experiment was to be conducted. The researcher acted as an observer to record possible discrepancies and unexpected events. The scores obtained by the top twenty-five per cent and the bottom twenty-five per cent of the pilot sample were considered. Using item analysis procedure, the facility index and the discrimination index for each item were obtained. Items with facility indices between 20%-70% and with discrimination indices greater than 0.21 were selected. The views of experienced teachers were taken into consideration and amendments were made accordingly, thus leaving twenty-five items for the pre-test and the post-test.

All the twenty-five items were in multiple-choice format, covering five levels of map skills: orientation and direction, location and reference system, distance and scale, symbolism, contour and map reading. The retention test (delayed post-test) was based on the same table of specifications as the achievement test and consisted of twenty-five multiple-choice questions.

Results

A preliminary analysis of data has verified that there were no significant differences in general academic performance and map skills attainment as measured by the primary school leaving examination (PSLE) and the pre-test. Neither was there any significant difference between boys and girls before treatment. Therefore the random assignment of the intact classes to their respective treatment groups could be considered appropriate in providing statistically comparable groups for this study.

Figure 12.1 indicates that there was a significant difference in treatment effects between the four groups (F = 37.33, df = 3, P <.001).

Source	df	Sum of Squares	F
Main Effects	3	560.28	37.33**
Curriculum	1	311.55	62.28**
Methodology	1	242.93	48.56**
Interaction	1	5.80	1.16
Error	140	735.39	
Corrected Total	143	1295.67	

** significant at p < .001

Figure 12.1 ANOVA of the mean scores of achievement tests.

In an effort to isolate the specific contribution of the treatments in map reading, the analysis of marginal means was adopted (Tuckman, 1978: 340). This allowed effects of curriculum structures and teaching methods to be separated. The procedure provided the opportunity to examine how curriculum structures and teaching methods had influenced pupil achievement in map reading. The Tukey's studentised range (HSD) test for comparison of means between treatment groups indicated that there was a significant difference between Treatment One (Mean = 17.33) and Treatment Four (Mean = 11.97) at the .05 level. The difference between means was 5.35 as shown in Figure 2. Therefore, Hypothesis One can be accepted. This implies that a hierarchical sequence of curriculum structure combined with practical learning is superior to other approaches in map skills instruction.

The issue raised in the second hypothesis was that whether curriculum structure and teaching methods influence retention and durability of map skills. The instrument used was a 25-item delayed post-test of equivalent difficulty to the pre- and post-tests. A 2-way ANOVA was used to analyse the data.

Group Comparison	Difference between Means			
	1	2	3	4
1	—	2.99*	3.35*	5.35*
2	—	—	0.36	2.36*
3	—	—	—	2.00*

* comparison significant at p < .05

Figure 12.2 Tukey's studentised range (H.S.D.) test for achievements between treatment groups.

Source	df	Sum of Squares	F
Main Effects	3	454.42	31.14*
Curriculum	1	223.82	46.01*
Methodology	1	227.59	46.79*
Interaction	1	3.01	0.62
Error	140	715.06	
Corrected Total	143	1169.48	

* comparison significant at p < .001

Figure 12.3 ANOVA of the mean scores of retention tests.

Figure 12.3 shows that there was a significant main effect at .001 level (F = 31.14, df = 3, p <.001), leading to the conclusion that there was a significant difference in treatment effects on retention and durability of map skills previously acquired. The results of this study indicate that hierarchical sequence and practical-learning are superior to non-sequential and direct-teaching in the retention and durability of acquired map skills as shown in the Tukey's pair-wise comparison of means between Treatments One and Four which gives a significant difference of 4.85. As such, the second hypothesis can be confirmed at the .05 level of significance, (Figure 12.4).

Group Comparison	Difference between Means			
	1	2	3	4
1	—	2.82*	2.81*	4.85*
2	—	—	0.01	2.02*
3	—	—	—	2.03*

* comparison significant at p < .05

Figure 12.4 Tukey's studentised range (H.S.D.) test for retention between treatment groups.

3. Discussion of the findings

In order to locate the particular strengths and weaknesses in map reading a post hoc analysis of the specific map skills was performed. Results of the analysis lend support to many research findings that map skills acquisition is a gradual process in which pupil begins with the understanding of basic concepts such as direction, location, scale, and symbols. This is in accordance with Gerber and Wilson's (1984) proposed sequence of map skills instruction. The results of this investigation also confirm that children at the age of 12+ are above to master the grid reference system in identifying location. This is shown by the 72% of correct responses on location and grid reference in the posttest results. However, though pupils were able to identify geographical direction correctly, they seem to have some problems in using angular bearings and in comparing scales for maps of different sizes. Meyer (1973) argues that symbols and map reading skills are more complicated and thus dependent upon good instruction for better achievement. This was verified in the present study. The pretest result for symbolism was 28.3% and for map reading skills was 25.6%, which, after training, increased only to 39.6% and 37.1% respectively. This is a clear indication that the concepts of symbolism and map reading skills are more difficult to understand. A good grasp of the concepts of direction, location, and scale is necessary before pupils can fully understand the meaning of symbols and contours and thus draw conclusions from them for map interpretation.

Based on the results of this finding, it is likely that the hierarchical structure used in this study is the optimum sequencing for map skills instruction, i.e. -

1. orientation and direction;
2. location and reference system;
3. distance and scales;
4. symbols; and
5. contour and map reading.

This could serve as a common framework for a better understanding of map skills in the secondary schools.

4. Conclusions

The findings of this study support the contention that practical experience and sequential skills enhance the learning of map skills and also improve the retention and durability of the acquired skills. Pupils are more likely to achieve better overall performance and retention if they follow a hierarchical sequence of curriculum structure and a practical-learning approach to map skills acquisition. Such a conclusion, because of its limited sample, should, however, be regarded as providing only insights into areas requiring further research to establish the full reliability and significance of these results.

REFERENCES

Atkins, C.L. (1981) "Introducing basic map and globe concepts to young children", *Journal of Geography*, 80(6), 228-233.

Boardman, D.J. (1974) "Objectives and constraints in geographical fieldwork", *Journal of Curriculum Studies*, 6, 158-166.

Gerber, R., and Wilson, P. (1984) "Maps in the classroom", in J. Fien, R. Gerber and P. Wilson (ed.), *The Geography Teacher's Guide to the Classroom*, Melbourne, McMillan.

Graves, N.J. (ed.) (1982) *New UNESCO Source Book for Geography Teaching*, Paris, France, United Nations Educational, Scientific and Cultural Organisation.

Hill, P.W. (1984) "The use of structural equation modelling to investigate hierarchical organisation in learning and cognition", *The Australian Journal of Education*, 28(3), 291-308.

MacKenzie, A.A., and White, R.T. (1982) "Fieldwork in geography and long-term memory structures", *American Educational Research Journal*, 19(4), 623-632.

Meyer, J. (1973) "Maps skills instruction and the child's developing cognitive abilities", *Journal of Geography*, 72(6), 27-35.

Walford, R. (ed.) (1981) *Signposts for Geography Teaching*, London, Longman.

13: TRADITIONAL DANISH PRACTICE IN CARTOGRAPHIC LEARNING

Troels Raadam

This study illustrates how different teaching materials used individually or in combination may be used to introduce pupils of year 3 (age 9-10 years) to the use of cartography.

Danish geography teaching is based on the Danish School Act of 1975. This Act contains the general aims of all teaching in "Folkeskole" as well as specific aims for every teaching subject such as geography. Each subject has its own general curriculum statement followed by more detailed teaching guidelines containing discussions about the nature of the subject, statements of content and recommendations for teaching methods and aids. In Denmark geography is usually taught in one weekly lesson in years 3-5 and two weekly lessons in years 6 and 7. In year 8, geography is one of the numerous non-compulsory subjects.

The broad aims of the syllabus rest with the principless of the community. Thereafter, it is the teachers' task to choose, organize and teach the content. The teachers normally base their teaching on materials from commercial publishing houses. Despite there being such a small textbook market, there are about 70,000 pupils in a year - 8 geography series have been published since 1976 as well as several supplementary booklets. The geography series are rather different both with regard to content and method. They reflect different interpretations of the syllabus aims as well as the authors' interpretations of the recommended teaching methods.

Theoretically, a Danish teacher has a free choice of the teaching materials he or she wishes to use. In practice the teacher is often obliged to use the books which his or her predecessor has chosen. Some teachers do not use published materials and produce teaching materials on their own or in co-operation with colleagues, but this is rare due to lack of time and the fact that geography (and biology and history) in years 3-5 is often taught by teachers without any formal education in the subject. This means that these teachers are not competent to produce teaching materials on their own, especially on cartographical topics which are considered to be rather difficult. Such teachers make more use of published teaching material than more qualified teachers, who can organize their teaching in the subject more independently. In this connection it should be mentioned that geography textbook series are increasingly supplied with guidance materials in order to support unskilled teachers.

The factors listed above justify the assumption of this paper that the content and instructions of published geography materials are a reasonable indication of the way most Danish pupils are introduced to the use of maps.

Introduction to map use in textbooks and atlases

This section describes how selected books and atlases present a systematic introduction to map-use. The study takes as its starting point Simon Catling's (1978) analysis of the elements of the map:

1. Location and direction
2. Vertical point of view
3. Scale and distance
4. Symbols (point, line and area; iconic - abstract)
5. Generalization (selection, omission, simplification)
6. Text on the maps.

In order to compare educational materials a statement is needed to show which map elements are important and in which order the elements should be introduced. The model of the scheme (Figure 13.1) shows some of the possible subjects under the headings in each column, which may be used to describe the planned teaching.

An examination of the systematic map learning approach presupposes that the pupils' material has been studied in the order presented in the pages, unless another order is especially stated in the teacher's guide. Thus the scheme specifies the order in which the various map reading activities are to be taught and the geographical links between them.

1. The Danish situation

The scheme has naturally been adapted to the Danish context and accordingly a brief explanation of the place of mapping in the Danish curriculum is needed.

1 **Content:** Regional themes, systematic themes, geographical concepts.

2 **Illustrations and environmental scale used:**
Photographs, plans, sketchmaps, outlinemaps, topographic maps, general environmental or physical maps, single or multiple concept maps.

3 **Cartographic themes or elements:**
Plan-view, position, location, direction, scale, symbols including relief, generalisation (content discrimination or selection and simplification).

4 **Cartographic activities (pupils' activities):**
Recognise elements, draw phenomena seen from above, draw symbols, draw free-hand maps, draw routes, correlate phenomena and symbols, correlate oblique and vertical aerial photographs and a map, read symbols from a map, colour areas, measure distance by means of a line-scale, find directions, 'walk a tour' on the map, draw a map to scale of the classroom and/or school surroundings, draw an environmental map from a vertical aerial photograph, find localities by correlating two different maps, locate places, draw legends, etc.

5 **Workbook and/or worksheets.**

6 **Illustrations and environmental scale used:**
as in 2 (above).

7 **Cartographical themes/elements:**
as in 3 (above).

8 **Cartographic activity:**
as in 4 (above).

9 **Map-type and scale:**
General environmental maps, general physical maps, political maps, other thematic maps.

10 **Use of maps:**
reference, localisation

Figure 13.1 The schedule for analysing maps in textbooks and atlases

The previous curriculum of 1960 mentions maps as the most important aids of geography teaching, but did not give precise instructions on how to use them. The curriculum of 1976 (Undervisningsministeriet, 1976) is more comprehensive and innovative on the subject of map reading. This curriculum states that maps should be used because:

"It is a prerequisite for later teaching that pupils in years 3-5 acquire knowledge about simple media or sources which will help them in their orientation and localization of the environment through their work in geographical themes".

Then the curriculum describes the teaching aids in question and the order in which they should be introduced. At first, aerial photographs - oblique and vertical - and different types of maps which should initially be at larger scales (1:100 - 1:10000) should be used. Later, topographical maps (1:25.000 - 1:100.000) (if necessary with slight alterations), maps from atlas and simple topical maps (thematic maps) relevant to the chosen content will be introduced. Furthermore, the globe is to be used, together with satellite photos. The importance of using concrete examples is ilustrated as follows:

"The use of maps and compasses has to be practised outdoors as well as in connecion with maps and aerial photographs. In this way the pupils will obtain an ability to make observations, locations and descriptions of both their own local area and areas with different landscape features".

Finally, the maps which the pupils should have mastered by the end of their 3 years of geography teaching are described:

"The pupils must be able to read and interpret aerial photographs. The pupils must be able to use, i.e. read and understand, the maps mentioned as well as maps from timetables, travel folders, etc. At the end of the 5th year the pupils should be able to read and interpret a selection of maps from the atlas".

2. An example of the analysis of map use

Due to lack of space only a few examples from one of the examined teaching aids are detailed here. The "Geografforbundets geografisystem" (Dollner, T. et al. eds., 1984 and 1985) which is one of the newest and most commonly used textbook systems is used here. It consists of a textbook and a workbook for each class as well as a common teacher's guide for years 3 to 5. The tasks of the workbook form a supplement to the subjects of the textbook. They are especially intended for pupils to work on their own. In each textbook a number of countries or regions is covered as well as one systematic subject, for example:

"GO-1 for year 3: Denmark, the Earth and the World, Greenland, Sri Lanka, Norway and Fulbe - A people of Africa.

GO-2 for year 4: Himalaya, Map learning, Sweden, Mocambique, The Faroe Islands, USA.

GO-3 for year 5: Western Germany, Iceland, weather and climate, Australia, Mexico, Japan."

The map learning is introduced in the first third of GO-1 (see Figure 13.2), but is developed most thoroughly in the section about "map learning" in GO-2. In each workbook the skills are first presented and then practiced in later sections.

photographs. Satellite photographs at different scales also play an important part. It appears that the author has made an effort to take this as a concrete starting point. In the context of the introduction, special mention may be made of the three first maps about Denmark which are false colour satellite images. The pupils have to compare the pictures with the atlas map and then guess the meaning of the colour on the satellite images. For example, the black colour represents cities and indicates the highest temperature on land.

Döllner, T. et al. (1984)

Textbook: GO 1					Workbook: GO 1				Different Danish Schoolatlasses	
page	reg.theme syst.theme geogr.theme	illustrations and evt. scale used	cartographical themes/ elements	cartographical activity	page	illustrations and evt. scale used	cartographical themes/ elements	cartographical activity	map-type and scale	the use of map
2-3	about geography	oblique photo		recognize elements	2	outlinemaps with a few features	symbols	read symbols	general	localiz.
					3	oblique photo		recognize forms, locate cities	general	localiz.
4	Denmark place names	satellite false-colour 1:2,5 mill.	symbols on false-colour map	draw outline map, mark towns	4	outline map	localization	recognize forms, locate towns, waters	general	localiz.
5		plan	point of view, symbol	draw a map about the school						
5	Denmark	satellite photo false-colour	symbol	explain symbols						
6-7	towns	oblique photo	point of view	make oblique drawing from a local observation point						
8-9	Rural district	oblique photo	point of view	draw map with symbols after oblique photo						
10-11	the sea	oblique photo			5-6	oblique drawings	symbols, localizations, distances	find routes, measure distances	general	localiz.
12-13	the Earth	satellite photo, globe	scale	measure distance, find routes, use compass to find cardinal directions	7	globe, outline map of Denmark	directions on maps	locate by means of compass directions	general	localiz.
14-15	continents of the world	World map physical with 4 layer-coloured levels	point of view symbol 3rd dimension	compare satellite photo and map, localization by means of cardinal directions	8	outline map	localization	locate parts of the world and oceans		

Figure 13.2 Analysis of the Go 1 Textbook and Workbook (Dollner et al., 1984)

All cartographical subjects are mentioned in GO-1, apart from generalization. The subjects are introduced in the following order: point of view, localization, symbol, distance (scale), direction and third dimension. Then, considerable space is given to work on localizations and symbols. As will appear from the scheme, the introduction to mapping in GO-1 is characterized by work with oblique photographs and drawings from oblique

The maps in the textbook are all very simple. They contain only few features, often shown in area colour. This suggests that the author is advocating a gradual introduction to the use of atlas maps.

The atlas is mainly used for simply locating the topics mentioned in the text (see Figure 13.3).

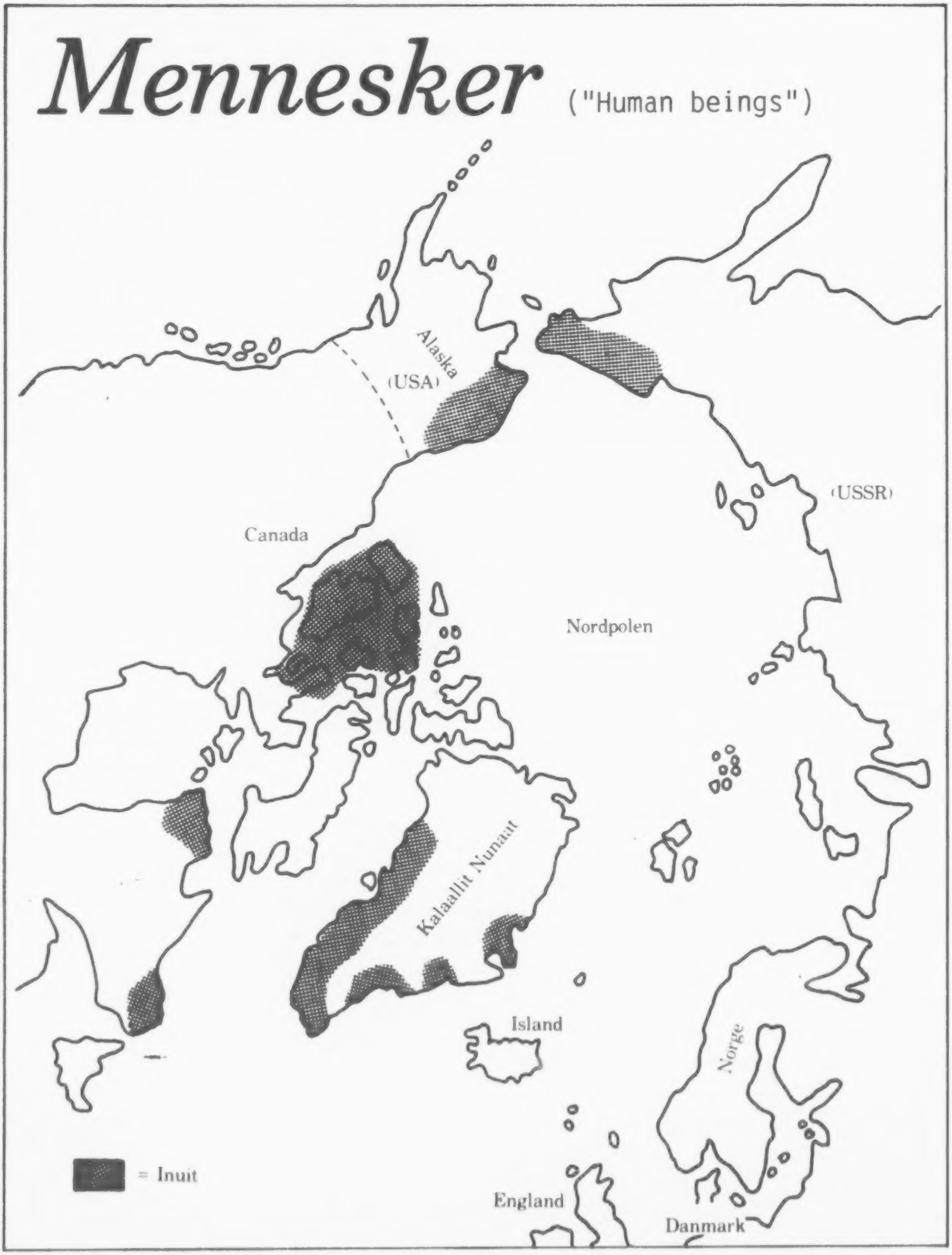


Figure 13.3 A map to show where the Inuit people live. The instructions to students were as follows: "The Inuit people are one nation even when they live in different countries around the North Pole. Look at the map. Find the places where the Inuit people live. What are the names of the states?"

The chapter about "Map learning" in GO-2 gives an introduction to the topographical map and in this context all the previous cartographical topics were repeated.

As Figure 13.4 suggests, a considerable amount of time is spent on work with contour lines. This begins at an early stage by Danish traditional standards where topic is often left until the 5th ot 6th year.

There are frequent references to the atlas and at the end of GO-2 a physical map at the scale of 1:550.000 about the Faroe Islands is prepared thoroughly. This topic is the 3rd dimension, represented by a coloured map with built-up areas and road systems.

The examples represent those parts of the textbooks which emphasize map learning and teaching. The entire system has been worked through. Basic map skills are repeated and gradually widened throughout it.

Merits of the scheme

The scheme may be considered a useful method for examining teaching materials. It is comprehensive in that it describes every detail of map learning. It may be applied to textbooks and atlases to ascertain whether all these details are included in the material.

The scheme can be used both as a means for selecting one set of materials from another, as a quick check of the quality of teaching materials, and as a starting point for the evaluation of teaching with regard to the formal content.

The scheme itself tells nothing about the best order of the particular cartographical elements and the weighting between the elements. This question may be answered by analysing a large number of both Danish and foreign teaching materials. While such a study does not take into account changes of children's context, i.e. housing conditions, radius of action and media consumption, it seems likely that there is a need for further study of the effect of the succession of the elements, and the relation between the elements, the cartographical activities and perceptual elements in order to improve map learning in

Döllner, T. et al. (1985) Textbook: GO 2					Workbook: GO 2				Different Danish Schoolatlasses	
page	reg.theme syst.theme geogr.theme	illustrations and evt.scale used	cartographical themes/ elements	cartographical activity	page	illustrations and evt.scale used	cartographical themes/ elements	cartographical activity	map-type and scale	the use of map
12-13	about maps	"pirate map" oblique and vertical aerial photo and 4 cm map	scale line, distance, direction, symbols, point of view	draw routes, measure, draw fantasy map, recognize elements on vertical aerial photo and oblique photo, draw a map after vertical aerial photo and compare with 4 cm map	6-7	4 cm map	symbols on 4 cm map	read symbols		
			3rd dimension, symbols	read contour line value, draw map of classroom to scale 1:50, 1:100, 1:200, draw and colour explanation of symbols			3rd dimension	read spot heights, draw profile line, go a walk on 4 cm map		
			scale (fraction), direction	measure distance, locate by means of cardial directions						
14	using maps	4 cm map	symbol scale	follow a route, read symbols, draw thematical map (routes) after 4 cm map, use scale						
15		vertical aerial photo city map 1:5000	point of view (generalisazation)	compare vertical aerial photo and city map						

Figure 13.4 Analysis of the chapter a "Map learning" in the GO-2 Textbook (Dollner, et al. 1985)

schools.

Conclusion

In sum, the teaching materials show some common features which together reflect the strong and relatively uniform Danish tradition on this field. The most important common features are:

1. The introduction to cartographic elements is always carried out together with the teaching of geographical concepts. Cartographic content is usually used to support the geographical content.

2. Map reading is regarded as a skill which is taught early in the school curriculum. Maps are always introduced at the beginning of year 3 when proper geography teaching starts.

3. Most of the geography teaching materials start with situations or in surroundings, which are known to the pupils: e.g. classroom, school and near surroundings, shopping or holiday trips.

4. All teaching materials use the sequences of horizontal photographs, oblique photographs, vertical aerial photographs and maps, but with different significances to the elements. In the change from vertical aerial photographs to maps, the use of iconic symbols is emphasized.

5. In all materials the pupils work partly with sketch maps or outline maps which have to be finished by drawing symbols or by colouring areas.

6. In all materials the pupils work with tasks on maps, for example localization, drawing of routes, determination of directions and measuring of distance.

7. All teachers' guides request the teachers to support the map learning with practical work with mapping: measuring, determination of directions, drawing of symbols and map-use.

8. All pupils have to learn to measure distances on a map by comparing distance on the map with the scale-line. The calculation and use of the scale fraction is introduced at 4th year level or later.

Some minor differences between the earliest and newest materials are interpreted as an expression of emerging changes. These include:

1. the dedication of fewer pages to map learning in the new geography systems.

2. the tendency for older materials to advocate systematic teaching of mapping skills and to emphasize the need for practising these skills.

3. the tendency for older materials to avoid working with contour lines or recommend leaving their teaching until year 5 or later.

All geography systems refer frequently to the atlas. Both of the newest geography systems recommend maps of the environmental type.

The exciting and important question of how pupils manage the leap from understanding large-scale maps to small-scale maps is not answered. Macrospaces cannot be experienced as a whole in the same concrete way as the microspaces, e.g. a part of a town or a village. Here, pupils can orientate themselves in their own surroundings and at the same time see the surroundings represented on the map. An atlas map cannot be experienced directly because of scale and the generalizations derived from it. It is not its purpose to illuminate the details, but to give a survey of the relations between the details. Could this be managed by using satellite photographs in association with atlas maps in the same way that we now associate vertical aerial photographs with topographical maps?

It appears implicit from the materials that the goal of small scale map could be reached by working with symbols on satellite images and progressing through many small steps to an understanding of small-scaled atlas maps. The use of environmental maps may offer the best solution, but the relations have yet to be properly examined.

REFERENCES

Catling, S. (1978) "The Elements of the Map", *Classroom Geographer*, March, 2-10.

Dollner, T., Thomsen, J. and Tunebjerg, T. (ed.) (1984) *GO 1, Geografi for 3-5. klasse (Geography for years 3-5)*, Brenderup, Geografforlaget.

Dollner, T. et al. (ed.) (1985) *GO 2, Geografi for 3-5. klasse (Geography for years 3-5)*, Brenderup, Geografforlaget.

Undervisningsministeriet (Ministry of Education) (1960) *Undervisningsvejledning for Folkeskolen*, Copenhagen.

Undervisningsministeriet (1976) *Undervisningsvejledning for Folkeskolen nr. 11*, Copenhagen.

14: FIGURES IN THE LANDSCAPE: SUSTAINING THE SOCIAL DIMENSION IN GEOGRAPHY TEACHING

Louis Murray

As a result of the British Conservative government's deliberations on curriculum and examination reform, an announcement by the Secretary of State for Education and Science on 20 June 1984 indicated the intention to reform the dual 16 plus examination system in England and Wales.

The new, unified system is entitled the General Certificate of Secondary Education (G.C.S.E.). It replaces the General Certificate of Education (G.C.E.) 'O' Level and the Certificate of Secondary Education (C.S.E.) examinations. Courses for the new examination began in September 1986 and the first G.C.S.E. examinations will take place in June 1988.

Given that the G.C.S.E. will be administered by five groups of examination boards, the Department of Education and Science expects that syllabuses for a single subject such as geography will conform, across England and Wales, to "subject specific" National Criteria monitored by the Secondary Examinations Council. The National Criteria for a given subject specify syllabus aims and objectives, minimum content requirements, and assessment techniques to be used, including the methods by which "differentiation" in students' achievements will be tested. (Secondary Examinations Council, 1985)

These examination developments reflect a number of compelling demands in secondary education in the United Kingdom. These include a growing requirement for the raising of the examination performance standards of all candidates; a demand for more explicit meaning for examination grades; a need for the clarification of subject goals in terms of knowledge and understandings, skills and values; a profession-induced demand for the incorporation of a substantial component of teacher assessment in syllabus course work; and the general educational imperative of interpreting "differentiation" in such a way that the examination will permit a student to show what "he or she knows, understands, and can do".

Under G.C.S.E. rubrics, geography teachers will need to exercise considerable discretionary judgements in selecting study material that meets the technical specification of the syllabus assessment objectives that are additional to, but derived from, the National Criteria. In the case of Geography Syllabus A of the Southern Examining Group, a teacher may choose Assessment Pattern: A1, in which the regional content for examination Paper 2 is pre-specified. This includes six nominated regions of the U.K., France, Italy, Netherlands, U.S.S.R. west of the Urals, defined collectively as "Europe"; Brazil or India, Pakistan and Bangladesh or Nigeria, defined collectively as the "Developing World". Alternatively, a teacher may choose Assessment Pattern: A2 in which the regional content for examination Paper 2 is solely the business of the teacher. The only stipulation is that appropriate scale factors, local, regional, national, international, world, be observed in the selection of content exemplars. Furthermore, teachers are expected to "marry" the assessment pattern selected to the key generalization which underpins the syllabus conceptual structure. Examination Paper 1 is primarily a skills-directed topographical mapwork paper and it remains substantially similar, as does the coursework component identified as examination Paper 3, under both assessment patterns. Both assessment patterns will make heavy demands on a teacher's capacity to select content as well as to deliver it meaningfully in the classroom.

Some suggestions for interactive teaching styles appropriate to G.C.S.E. courses

Whilst acknowledging the extra demands on teachers that Assessment Pattern A2 is likely to make, the author welcomes the element of choice it offers. It will enable enterprising teachers to choose regional content which can be incorporated into problem-solving activities with a human dimension. The spirit and ethos of the new G.C.S.E. advocate a move away from "receiving wisdom" through rote learning and towards a practical engagement with geography as a subject that renders meaningful the conditions of everyday life. G.C.S.E. geography attempts to make "people" in the context of "place" a central emphasis.

This underlying principle is reflected in the key generalizations that act as a conceptual skeleton for the syllabus. For example, one of the key ideas in Unit D - Development, of the Southern Examining Group Syllabus A: "Environments and their associated resources offer constraints and possibilities for development."

Students may be helped to develop an understanding of this generalization through work on such topics as environmental hazards, problems of transportation over hostile terrain, mining and extractive industries, fragile landscapes susceptible to tourism, pests and diseases as a constraint on settlement and agriculture, and water-supply in arid or densely populated regions.

The activities which follow are designed to help students to explore some aspects of the key idea quoted above. The activities involve interactive teaching styles. Such styles emphasize a social approach to problem-solving in which free discussion, self-directed analysis and decision-making which models the decisions that have to be made by those who actually inhabit the geographical environment under study. Interactive teaching styles encourage an affective involvement with the objects of study. Thus they create motivation and add to realism. However, these educationally desirable features of interactive teaching may not necessarily be reflected in the objectives/assessment weighting structure of any given syllabus. Despite the stated ethos of G.C.S.E. geography, the attainment of values objectives are allocated only 5% of the marks in the Southern Examining Group Geography Syllabus A.

Activity 1 - The "Tea and Sugar Train"

To live in isolation from other people is not a condition that is usually welcomed or desired. It is however, the lot of certain occupational groups such as Pyrenean shepherds, Antarctic research scientists, and railway workers in outback Australia. Such people, by virtue of their circumstances, must come to terms with non-urban and sometimes hostile environments. The "Tea and Sugar Train" exercise illustrates the problems faced by people who live in isolated areas. The activity explores the constraints set by the physical environment on human activity and simulates some possible responses if ordinary human beings to social and geographical isolation.

1. Procedure

a) Divide the class into groups of three and issue each group with a copy of the sketch map (Figure 14.1).
b) Inform the class that the transcontinental railroad, from Sydney to Perth, traverses some of the most remote and underpopulated country in the world. The 580 kilometre section of the Nullarbor Plain from near Ooldea in South Australia to near Rawlinna in Western Australia, is crossed by the world's longest straight stretch of railroad. Students should find the route across the Nullarbor on a map of Australia.
c) Once a week the "Tea and Sugar" train leaves Port Augusta in South Australia to bring groceries and other necessities to the people of the settlements along the railway line. Grocery orders used to be given a week in advance. Ask each group to decide on one of the Nullarbor settlements as their place of residence. They are to make a list of the groceries and personal requirements that they would need for a week and which they will order from Port Augusta.

The placement of grocery orders in advance has been superseded. The Tea and Sugar train now has a retail van, a railborne supermarket, in which people can purchase whatever is on the shelves. As the train pulls into each stop the local residents clamber into the retail van to make their selections and to pay either in cash or in deductions from their wages.

d) When they have written out the grocery order the groups should discuss the following questions:
   i) How is the grocery order to be conveyed to Port Augusta?
   ii) What jobs would group members (as "people of the Nullarbor") have?
   iii) What luxuries, as well as necessities, might the "Tea and Sugar" bring?
   iv) How important would these luxuries be to people in an isolated community?
   v) What are the benefits and drawbacks of living in an isolated town?
   vi) What physical conditions are likely to set upper limits on the number of settlements along the railway line?

In conjunction with this exercise, students may be encouraged to read up on Australia in various textbooks. If possible, make available copies of: *The Min Min*, by Mavis Thorpe Clark. It is a marvellously evocative account of children growing up in one of the railway settlements of the Nullarbor.

A more recent popular account of the Nullarbor rail crossing is to be found in Eila Zwingle and William Albert Allard's article "The Tea and Sugar - Lifeline in Australia's Outback", which documents changes to the operating schedule of the "Tea and Sugar" and is well-illustrated with colour photographs.

Activity 2 - "Dyads and Triads"

"I have three chairs in my house: one for solitude, two for company, three for society." Henry David Thoreau (1817-1862).

The implication of the above remark is that patterns of social relationships are altered and reconstituted by changes in the numbers of people. Power, authority, coercion, compliance, cooperation, competition, etc., as social processes crucially operative in matters to do with environment and development, appear in different configurations when one is alone, when two people form the smallest possible social system, when three people form a triad or when four or more people group together. This activity helps to show how these different configurations link human decision-making to the physical features of the landscape.

Procedure

Arrange six chairs to face the class as shown in Figure 14.2. The chairs are occupied simultaneously by volunteers. Spokespeople for the remaining class members now ask the individual, the dyad, the triad in turn the following question:
"What can you do that the persons sitting alongside

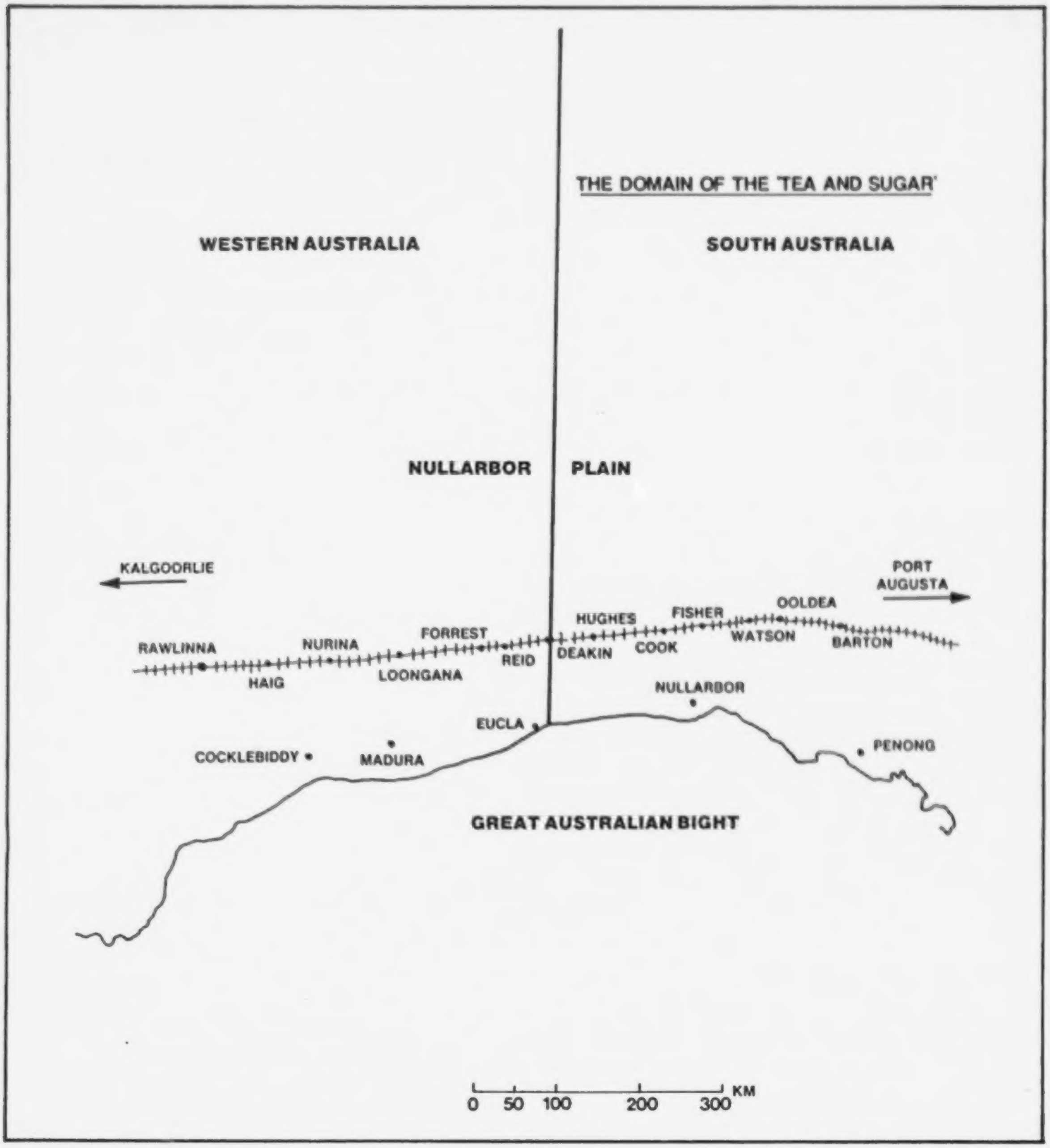


Figure 14.1 The rail link across the Nullarbor

1. The person sitting alone may be expected to say that he or she can do whatever he/she likes. Alternatively s/he may say that s/he is unfettered by relationships and does not have to concern himself or herself with the actions of others or the consequences that his/her actions may have for others.

2. The dyad will probably say that they can act as a pair but that their actions will dissipate if one person leaves the dyad. Furthermore, actions taken in tandem are consequential for both, each member of the dyad having to consider his/her partner.

3. The triad may be expected to say that they have more freedom of action. They can operate in unison, two can operate in coalition against one, one can dominate the other two, and one can leave without completely fracturing the social system.

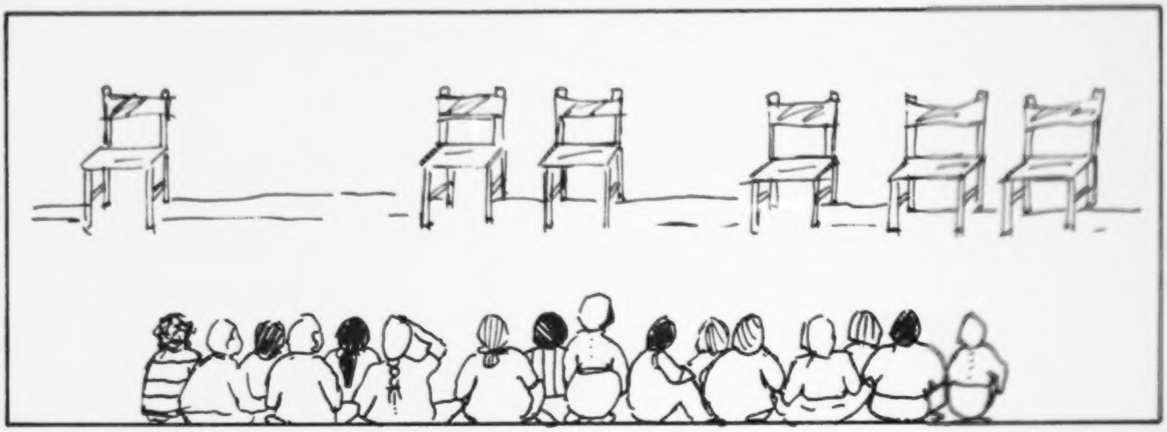


Figure 14.2 The arrangement of the chairs for "Dyads and Triads".

After completing this initial phase of activity the teacher may explain the indicators of social processes at work in society and how this is often related to the function of groups. Consider for example the "caucus rule" style of interaction at some political party conventions in the United Kingdom or Australia; the cohort structure of the Imperial Roman army; the caste system of India; the composition of boards of school governors; and the "cabal" of ministers under Charles II.

The teacher may now invite new students to occupy the chairs of individuals, dyads, triads. Once again, spokesmen pose the question: What can you do that the persons sitting alongside cannot do? This time the individual, dyad and triad must answer in the context of the following environmental situations in which they find themselves. (These "situations" should be written up on a blackboard in full view of the class.)

1. Individual
You have sole ownership of 150 hectares of prime, well-watered farmland suitable for the production of cash crops. You also own the mineral rights to this land and geological reports suggest the presence of high-quality coal in extensive deposits just under the surface.

2. Dyad
You each occupy agricultural smallholdings, 3 kilometres apart, fronting the same stream. You are both licensed to irrigate your property by pumping a fixed volume of water from the stream each year. However, stream flow is erratic and pumping excessively by the smallholding higher up the valley can affect both the quality and volume of water available to the smallholding lower down the valley.

3. Triad
The three of you have formed a consortium to invest in a national park in upland Britain. You are all moderately motivated by profit but your interests are diverse. One member of the triad has experience of raising Herdwick sheep and managing wet moorland pasture. A second member has no agricultural experience but is practised in raising finance for the construction of timeshare apartments in scenic areas. The third member is a long-standing resident in the national park with direct access to local government.

The teacher should point out that the activity is "open", that the deliberations of the individual, dyad and triad reveal some of the possibilities for social processes of different kinds to occur when individuals are faced with environmental choices. Students should not be allowed to be deflected from the intellectual content of the activity by making moral evaluations of the decisions reached by the individual, dyad and triad despite the fact that some students are "prone" to such a response.

Conclusion

This article attempts to show how externally-imposed syllabus demands can be reconciled with interactive teaching styles and discretionary-judgements in the classroom. It is inevitable when working to a centrally formulated syllabus that this reconciliation must be made by the individual teacher at the chalkface. Accordingly, teachers should scrutinize curriculum documents, looking for opportunities (rather than constraints) to introduce their own teaching preferences to the formal requirements. Such are the demands of professionalism.

REFERENCES

Clark, M.T. (1966) *The Min Min*, Melbourne, Lansdowne Press. (now reissued as a Collins-Armada Lions Paperback).

Secondary Examinations Council (1985) *Working Paper 1 - Differentiated Assessment in G.C.S.E.*, London, SEC.

Zwingle, E. and Allard, W.A. (1986) "The Tea and Sugar - Lifeline in Australia's Outback" *National Geographic*, 169(6) June.

15: THE PUBLIC INQUIRY AS A TEACHING APPROACH

David Boardman

The contribution of the public inquiry to decision-making in a democracy depends on the active participation of members of the public. Each year in Britain about 3,000 public inquiries are held into a wide range of planning proposals (Le-Las, 1987). The growth of environmental awareness during the last two decades has been accompanied by a greater public interest in environmental issues which are subject to planning control. It is important that students should be familiar with the procedures involved in arriving at decisions which affect the environment so that subsequently, as informed members of the public, they can attempt to influence those decisions.

A public inquiry can be simulated in the classroom if students adopt the roles of various participants who have an interest in, or are affected by, a proposal which would markedly change the environment. Students learn to examine the issue from different perspectives and attempt to interpret and evaluate the available evidence. The benefits of simulations, including role play, have been discussed by Fien et al. (1984), who emphasise that they should be integrated into teaching units. In particular, simulations encourage students to reflect on their own values and to appreciate the value positions held by other people (Fien and Slater, 1985).

The case study which follows is concerned with the consequences of the location of a large industrial plant in close proximity to an area of exceptionally high landscape quality. The students practise a range of map reading and interpretation skills, and attempt an appraisal of the environment shown on a topographical map. Although the case study is specific to a particular location in Britain, the procedure may readily be adapted to other parts of the world where water supply is a major factor in industrial location.

The case study

1. Wasdale and Eskdale

The county of Cumbria in north-west England contains within its boundaries the Lake District National Park. Mountains or fells rise to altitudes of more than 900 metres and are separated by deep glaciated valleys, the largest of which are occupied by long ribbon lakes. West Cumbria contains some of the most spectacular contrasts in scenery in England: within a distance of 20 kilometres the land rises from the sea across a narrow coastal plain to the top of England's highest mountain, Scafell Pike.

The western part of the Lake District National Park is more remote and less accessible than the popular and frequently visited central and eastern parts. One of the western valleys is Wasdale in which lies a large, deep lake, Wastwater (Figure 15.1). Although the surface of this lake is 60 metres above sea level, its maximum depth is 75 metres. The fact that at this point the lake bed is actually below sea level testifies to the erosive power of the glacier which once occupied the valley. The south-eastern shore of Wastwater is dominated by a series of giant screes and these fan-shaped masses of frost-shattered rock fragments descend steeply right into the water.

The next valley to the south, Eskdale, does not contain a lake but illustrates the typical cross-profile of a glaciated valley with its flat floor and steep sides. The valley walls give way to more gently sloping benches or shoulders at higher levels. Tributary valleys which were once graded to join the pre-glacial valley now lie high above the main valley floor, with streams falling abruptly in a series of cascades. Open sections of the main valley floor are sometimes interrupted by more broken terrain, as at Boot, where the River Esk has cut down through a succession of rock outcrops. Terraces representing former levels of the river are well developed in places upstream from Boot.

Although Eskdale no longer contains a lake, evidence for the existence of a former glacial lake is to be found at the lower end of the valley. At Eskdale, Greenwater was trapped between the valley glacier in Eskdale and a large ice sheet over the Irish Sea which covered the coastal lowlands. As the ice margin moved backwards and forwards the lake level moved up and down accordingly. The main outlet for the lake water was to the south, and the high level channels used by the water can be seen today on the fell side south of Eskdale Green.

Wasdale and Eskdale clearly constitute classic country for the study of glacial features. The human impact on the environment, however, is seen with equal clarity a few kilometres away on the West Cumbrian coast outside the National Park.

2. Sellafield

The coastal plain to the north of the Esk estuary is dominated by the giant Sellafield (formerly Windscale) nuclear fuel reprocessing works operated by the government-owned British Nuclear Fuels Ltd. (BNFL) (Figure 15.1). Based at five sites in north-west England

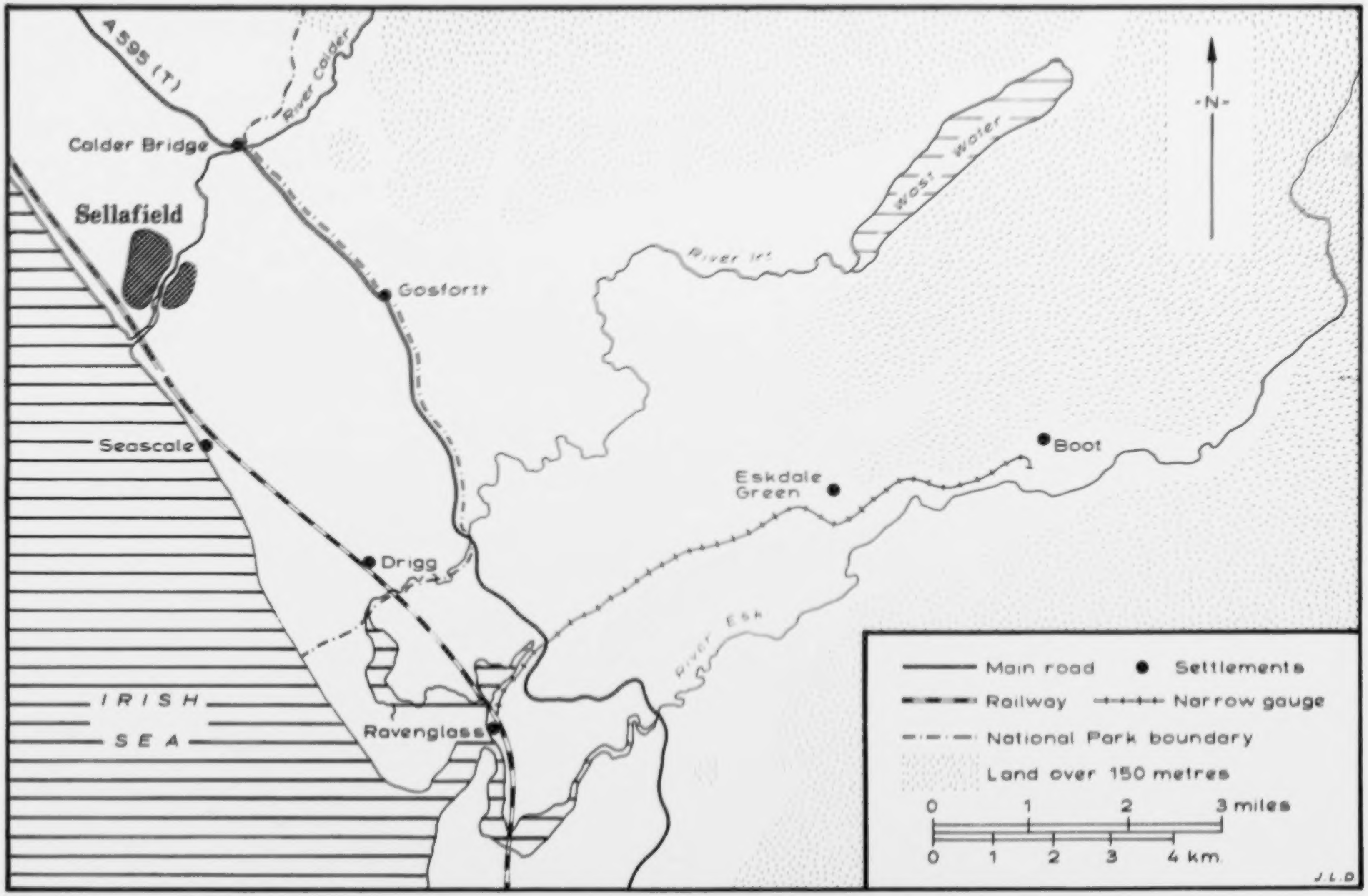


Figure 15.1 Sellafield and the West Cumbrian Coast

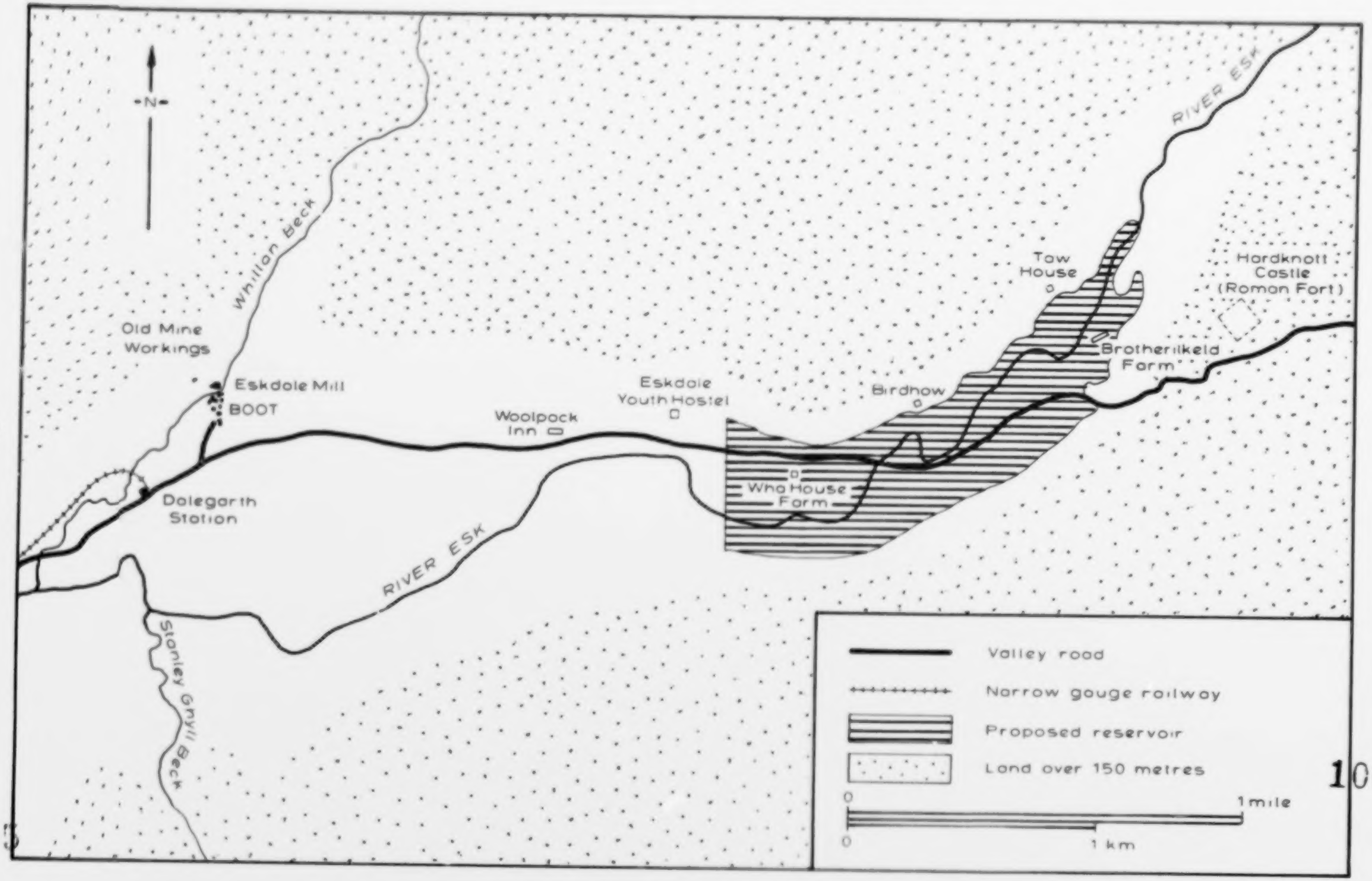


Figure 15.2 The site of the proposed reservoir in Eskdale.

and southern Scotland, BNFL produces nuclear fuel at a site near Preston, enriches uranium for use in modern nuclear power stations at another site near Chester, and reprocesses spent fuel brought to Sellafield by rail in specially constructed steel flasks. BNFL also operates two nuclear power stations: Calder Hall on the Sellafield site and Chapelcross in southern Scotland.

BNFL produces all the fuel for the 20 nuclear power stations in Britain which together supply about 20 per cent of the electricity consumed in the UK. The spent fuel discharged from nuclear power stations still contains at least 96 per cent uranium but to recover this uranium for re-use requires reprocessing. All of this reprocessing is carried out at Sellafield, where both uranium and plutonium are released for future use, as well as up to about 3 per cent by weight of waste which has to be isolated for storage. BNFL also has overseas contracts and some of the nuclear waste brought to Sellafield for reprocessing is shipped from other countries through the port of Barrow. About 7,000 BNFL employees work at Sellafield and another 5,500 contractors' employees are currently engaged in construction work on the site, which is one of the largest construction sites in Europe. The plant owes its location on the Cumbrian coast to the expanse of flat land adjacent to the sea, the availability of supplies of cooling water, and isolation from large centres of population. The site nevertheless places late twentieth century technology in close juxtaposition with the timeless natural, unspoilt beauty of the mountains which form its backcloth.

3. Water Supply

The reprocessing of nuclear fuel requires plentiful supplies of water. A public inquiry held in the Civic Hall, Whitehaven, between January and May 1980, considered two applications to increase the abstraction of water from lakes in the National Park. One was from British Nuclear Fuels Ltd., which planned to solve its water supply problem by increasing almost threefold the volume of water it abstracted daily from Wastwater through an existing pipeline to Windscale. The other application, submitted by North-West Water Authority, was to raise the level of Ennerdale Water, in the next valley north of Wastwater, by building a new and larger weir, and thus provide more water for Windscale and West Cumbria generally.

After the North-West Water Authority and British Nuclear Fuels Ltd. had presented their cases at the public inquiry, there was considerable public opposition to both proposals, mainly on the grounds that increased abstraction would produce fluctuations in the level of the lakes. It was argued that variations in water level would result in an unsightly and largely sterile zone at times of drawdown in dry weather, when areas of mud and stones usually under water would be exposed, creating an artificial rim round each lake. Objectors often referred to the rims of two other lakes in the National Park, Thirlmere and Haweswater, as demonstrating the deleterious effects of drawdown in dry weather. The proceedings of the public inquiry have been documented by Berry (1982).

The report of the inspector who conducted the inquiry concluded that both schemes would change the appearance of Wastwater and Ennerdale Water in a way that was totally out of keeping with the environmental scene. The Secretary of State for the Environment accepted this conclusion and thus ensured that both lakes would be preserved in their existing state.

Since the rejection of the Wastwater proposal, British Nuclear Fuels Ltd. has not submitted any further planning application for an alternative source of additional water supply. However, in view of the large volume of water required for reprocessing and the increasing amounts of spent fuel being reprocessed, it seems not unreasonable to assume that BNFL will submit a new proposal for increasing the supply of water to Sellafield in the near future. The hypothetical proposal considered here is that BNFL is making an application to construct a dam across the upper part of neighbouring Eskdale in order to create an artificial lake or reservoir from which water would be carried by pipeline to Sellafield. It should be emphasised that this is not a real proposal: the fact that it is hypothetical has the advantage of encouraging students to examine the present environment and possible changes to it before they occur instead of merely asking them to look at the changes after they have taken place.

The public inquiry

1. Preparation

The main resource for considering a proposal to dam a valley and create a reservoir is a topographical map on a scale of 1:25,000 or larger. The site for the proposed dam is selected and inserted on the map by joining the same contour on each side of the valley. If this contour is then followed upstream the extent of the resulting reservoir can be traced. The result of building a 30-metre high dam above Boot on the valley floor of Eskdale, which is at this point 70 metres above sea level, and flooding all land behind it up to the 100 metre contour is shown on the map (Figure 15.2).

The students then study the topographical map and list the features which would disappear under water. In the case of Eskdale, the farm building of Wha House Farm and Brotherilkeld Farm would both be flooded, as would several fields belonging to the farms. A two-kilometre length of valley road and several short sections of footpath leading from it would also be submerged.

In order to prepare for the public inquiry the students work in pairs or small groups. They are asked to adopt the roles of people who would have an interest in the scheme or would be affected by it. One group plays the management of BNFL, who have to present the proposal at the start of the inquiry. Some students adopt the roles of people who would probably support the scheme, whilst others play the roles of people who would object to it. They are given cards outlining their roles which they then develop by discussion (Figure 15.3).

MANAGING DIRECTOR OF BRITISH NUCLEAR FUELS LTD Your company urgently requires more water in order to expand fuel reprocessing at Sellafield.	PLANNING OFFICER FROM THE LAKE DISTRICT SPECIAL PLANNING BOARD Your policy in the western part of the National Park is to provide for fairly small numbers of tourists.
ARCHITECT OF THE RESERVOIR DAM You have carefully designed the dam so that it will blend with the scenery in Eskdale.	DIRECTOR OF FRIENDS OF THE EARTH You are concerned about the artificial rim round the lake at times of drawdown in dry weather.
MANAGER OF THE RAVENGLASS AND ESKDALE RAILWAY You operate the narrow gauge steam railway which carries tourists between Ravenglass and Boot.	CHAIRMAN OF CUMBRIANS OPPOSED TO A RADIOACTIVE ENVIRONMENT Your members are not satisfied with safety standards at BNFL and are convinced that the dam could collapse.
PROPRIETOR OF THE WOOLPACK INN Your inn has a good reputation for its bar, restaurant and accommodation for visitors.	LOCAL HISTORIAN You wish to preserve the road up Eskdale as it is a former Roman road leading to the Roman fort at Hardknott Castle.
OWNER OF ESKDALE MILL Your historic mill, which has a water wheel and pair of millstones for grinding corn, is popular with tourists.	REPRESENTATIVE OF ESKDALE FISHING CLUB Your members fear that fish will not survive in the reduced flow of water below the dam.
DISTRICT MANAGER OF NORTH-WEST WATER AUTHORITY You are unable to supply more water to Sellafield from any existing source.	CHAIRMAN OF THE FRIENDS OF THE LAKE DISTRICT Having successfully helped to stop the Waste Water proposal, you are determined to ensure that Eskdale is left undisturbed.
REPRESENTATIVE OF BNFL EMPLOYEES Your jobs depend on the continuing expansion of reprocessing at Sellafield.	PUBLICITY OFFICER OF GREENPEACE Your organisation opposes further expansions of Sellafield because it discharges radioactive waste into the Irish Sea.
WARDEN OF ESKDALE YOUTH HOSTEL Your hostel is popular with fell walkers who climb Scafell Pike and other western mountains.	CHAIRMAN OF BOOT RESIDENTS ASSOCIATION Your members are concerned aobut heavy lorries using the valley road during the construction of the dam.
SUB-POSTMISTRESS OF BOOT Your sub-post office, which is also a small shop, is visited by tourists.	OWNER OF BROTHERILKELD FARM Your historic farm buildings and several of your best fields will be submerged.
OWNER OF WHA HOUSE FARM Although part of your farm will be flooded, you have been offered substantial compensation.	REPRESENTATIVE OF ESKDALE RAMBLING CLUB Your members maintain that the view from Hardknot Castle will be spoilt by the reservoir.

Figure 15.3 Role cards for the public inquiry

For this purpose supplementary resources are helpful. The most demanding role is that of BNFL management, who not only have to present the proposal but also explain it, justify it and later defend it. Students need information about the work undertaken at Sellafield, and this is available from the company in the form of leaflets, booklets and an annual report. They will require assistance in comprehending this material, however, and an alternative approach is for the teacher to prepare a sheet summarising the main activities of the company.

Other students should have access to background information on the environment from a standard reference book on the Lake District such as that by Millward and Robinson (1970), or a local guide to Eskdale such as that by Daniels et al. (1979). The Lake District Special Planning Board produces publications which explain its work to the general public, whilst the Lake District National Park Centre provides material for tourists, visitors and school parties. The environmental groups *Greenpeace* and *Friends of the Earth* supply publicity material, and organisations such as the Friends of the Lake District and Cumbrians Opposed to a Radioactive Environment explain their policies on request.

The teacher plays the role of the inspector who conducts the public inquiry. Useful guidance on the preparation and presentation of evidence and the conduct of a public inquiry has been provided by Le-Las (1987). A record of the actual proceedings at the earlier inquiry into Wastwater and Ennerdale Water has been produced by Berry (1982).

2. Procedure

The inspector opens the inquiry by asking the BNFL management to present the proposal. They explain that the company needs an additional source of water owing to the expansion of nuclear fuel processing at Sellafield. They point out that the floor of Eskdale is unusual among major Lake District valleys in not already being occupied by a lake. The proposed site of the dam in the upper part of the valley has been selected so that the buildings and land of only two farms will be submerged. The architect of the dam gives an assurance that he has carefully designed it to blend into the landscape and that the valley road will be realigned along the edge of the lake. The proposal is supported by the North-West Water Authority, which reports that it is unable to increase the supply to Sellafield from existing sources.

Support for the proposal also comes from the manager of the Ravenglass and Eskdale Railway, a narrow gauge steam railway which was originally built in the late nineteenth century to carry iron ore from the workings at Boot to the coast at Ravenglass. He reports on the success of a joint venture with BNFL which provides visitors to Sellafield with a coach transfer to the coastal terminus of the railway at Ravenglass, from which they travel up the valley in miniature carriages to Dalegarth station near Boot (Figure 15.4). He regards the proposed lake as an additional tourist attraction which will increase the number of passengers on the railway.

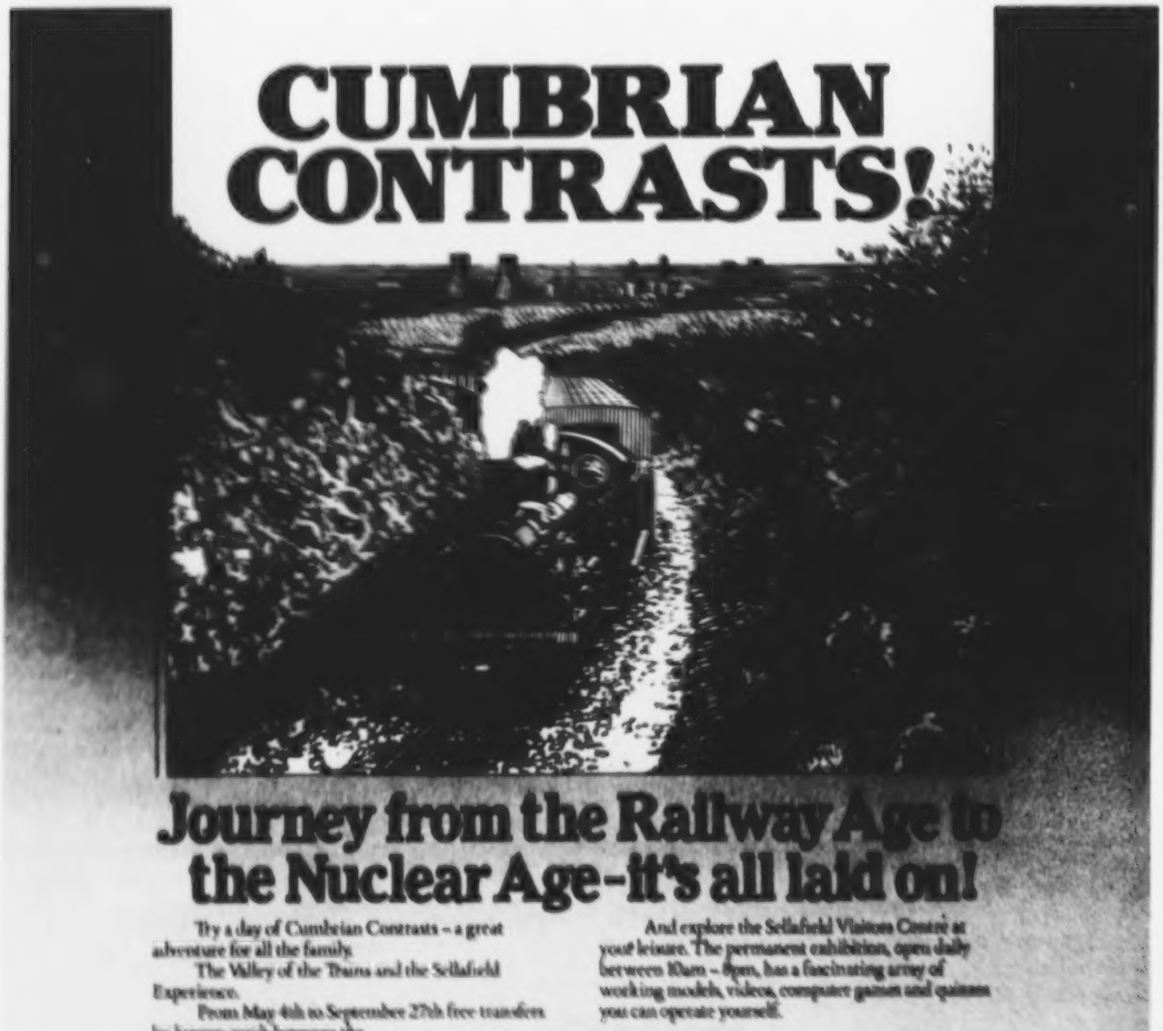
Objections to the proposed reservoir are led by the planning officer from the Lake District Special Planning Board, who explains that recreation management policy for the western part of the National Park is to maintain a generally low level of activity in order to preserve its peaceful and tranquil appearance. The chairman of the Friends of the Lake District, who presented evidence at the public inquiry into the Wastwater and Ennerdale Water proposals, is strongly opposed to the Eskdale reservoir and argues that the dam would be a visual intrusion into the landscape. Other objectors include the environmental groups Greenpeace and Friends of the Earth as well as several local residents and interest groups.

Although most of the role cards in Figure 15.3 indicate whether the participants support or object to the proposed reservoir, some complementary roles provide opportunities for contrasting viewpoints to be expressed. The owner of Brotherilkeld Farm, for example, would probably object to the flooding of part of his farm whilst the owner of Wha House Farm might be willing to sell up and move to a new location if he was offered adequate compensation. Similarly, the proprietor of the Woolpack Inn might welcome increased trade from visitors to the lake, whilst the warden of Eskdale Youth Hostel might give higher priority to environmental considerations than to visits from larger numbers of hostellers.

When all evidence has been presented participants on both sides should have an opportunity to ask questions and where appropriate put forward counter-arguments. At times the inspector may have to exercise skill and patience in presiding over a lively debate. All participants should be aware that the main purpose of their appearance at the inquiry is to influence the inspector, who has to make a recommendation on the basis of the evidence presented.

The controversy surrounding the reprocessing of nuclear fuel will inevitably arise at some stage during the inquiry. It will be difficult to separate this issue entirely from the proposal for the reservoir. As there has been strong criticism of Sellafield in the media, it is appropriate that participants in the inquiry should have an opportunity to debate whether the reservoir should be permitted in order to facilitate further expansion of the plant.

Thus, an objector might express concern about the environmental pollution resulting from the discharge of radioactive waste from Sellafield by means of a pipeline into the Irish Sea. He would refer to the radioactive contamination from this pipeline which Greenpeace discovered on the beaches to the north and south of Sellafield in November 1983, after which a 25 kilometre section of the coast was closed to the public for several months. In their defence BNFL management would refer to the annual report for 1986-87 in which the company declares that it is considerably reducing the levels of discharge into the sea by building new effluent treatment works and sea tanks which will treat and store contaminated waste before it is released into the sea.


RAVENGLASS & ESKDALE RAILWAY
SELLAFIELD VISITORS CENTRE
A DAY OUT WITH A DIFFERENCE
CUMBRIAN CONTRASTS

CUMBRIAN CONTRASTS!

Journey from the Railway Age to the Nuclear Age – it's all laid on!

Try a day of Cumbrian Contrasts – a great adventure for all the family.

The Valley of the Trains and the Sellafield Experience.

From May 4th to September 27th free transfers by luxury coach between the Ravenglass and Eskdale Railway and the Sellafield Visitors Centre make it easier than ever to combine the two in one day.

Visit either one in the morning and forget your car for the rest of the day. Just relax and enjoy a day out with a difference.

Take a trip back in time on England's oldest narrow gauge railway, pulled along by miniature steam engines through peaceful, unspoilt Eskdale – one of Cumbria's most beautiful valleys.

And step into the future at Sellafield which encompasses many areas of nuclear technology on one major site.

See the past brought to life at Ravenglass Railway Museum, and at Muncaster Mill – a restored water mill where traditional stone-ground flour is made.

There are shops and cafés at either end of the line and families are welcome for a meal, and a drink at the Ratty Arms – the railway's own pub at Ravenglass.

At Sellafield it's all free. Find out all about the nuclear industry on a guided tour of the site by luxury 'Sellafield Sightseer' coach.

And explore the Sellafield Visitors Centre at your leisure. The permanent exhibition, open daily between 10am – 4pm, has a fascinating array of working models, videos, computer games and quizzes you can operate yourself.

For full details ask for a copy of the Cumbrian Contrasts leaflet, write or telephone:
The Ravenglass & Eskdale Railway Co. Ltd, Ravenglass, Cumbria. CA18 1SW.
Tel: Ravenglass (065 77) 226.

OR

British Nuclear Fuels plc, Visitors Centre, Sellafield, Seascale, Cumbria.
CA20 1PG. Tel: Seascale (09467) 27735.

Figure 15.4 Advertisement for the Ravenglass and Eskdale Railway

Again, another objector might refer to the safety audit of Sellafield carried out by a team from the Nuclear Installations Inspectorate (NII) and published by the Health and Safety Executive (HSE) in December 1986. The report stated that safety at the plant was below the standards expected of the nuclear industry and warned that if significant improvements were not made within a year the HSE would order the closure of the plant until safety was improved. In reply BNFL management would remind the inquiry that the company had responded positively to the HSE report by undertaking to meet all NII requirements and agreeing a programme with the Inspectorate under which all the major improvements would be complete by the end of 1987.

It should be noted that, for the purposes of the public inquiry, water is required for the reprocessing of nuclear fuel, not the generation of nuclear power itself. To broaden the debate to include nuclear power would be to open up another issue, the political nature of which has been discussed by Huckle (1985) and Boardman (1987). The inquiry would be aware that the Conservative party in Britain is committed to the continuation and expansion of nuclear power as a source of energy, whilst the Labour party has adopted an essentially anti-nuclear policy which would lead to the phasing out of nuclear power stations. The return of a Conservative government with an overall majority of 100 seats at the general election held in June 1987 means that nuclear power will remain part of UK energy policy into the next decade. The consequence will be a continuing flow of spent fuel from nuclear power stations to the country's only reprocessing plant at Sellafield.

3. Follow-up

After a real public inquiry had ended the inspector would depart to write his report and make his recommendation. The follow-up to the simulated public inquiry can take a number of forms, differentiated according to the ability of the students. The more able students can be asked to write the inspector's report, stating the BNFL case for constructing the dam and reservoir, and following it with an account of the evidence presented by the supporters and objectors during the inquiry. The report would end with a recommendation and the reasons for it.

A more manageable task for other students would be to write a short article on the inquiry as if it were to be published in a local newspaper. This would contain a summary or selection of the points made by supporters and objectors, including the questioning of the BNFL management. A leader column could be added to indicate the newspaper's stance on the issue.

As an alternative to a written report, some students could prepare a verbal report and tape-record it as if it were to be transmitted as a news item by the local radio station. Yet another possibility would be for some students to make a video-recording of their report as if it were to be transmitted in a regional television news programme.

Conclusion

Although the case study of a controversial environmental issue described here is distinctive to a particular location, the activity may be replicated in other locations where increased water supply is required for industrial or domestic purposes. A proposal to build a dam across the valley and flood the land behind it to create a reservoir encourages students to consider changes in the environment before they occur instead of after they have taken place. The only essential resource required for the public inquiry is a large scale topographical map, although it is helpful to supplement it with a photograph of the valley if one is available. Reference books on the area and publications from environmental organisations provide useful additional resources.

Examination of the reservoir site on the map provides the students with valuable practice in using a range of map reading and interpretation skills (Boardman, 1983). They also learn to prepare a statement with supporting evidence and to present it to others for public debate. By participating in the simulation they experience the procedure followed at a public inquiry, and by listening to the contrasting viewpoints expressed they develop an appreciation of the values held by the various participants. The written or tape-recorded reports which the students produce after the public inquiry provide records of the proceedings for reference or assessment purposes.

Teachers will find guidance on ways in which controversial issues can be handled in the classroom in two useful books, *Teaching Controversial Issues* (Stradling et al., 1984) and *Controversial Issues in the Curriculum* (Wellington, 1986). Approaches which encourage discussion are examplified in *Education, Democracy and Discussion* (Bridges, 1979), whilst strategies for clarifying the values held by different people on a particular issue are outlined by Fien and Slater (1985). Background information on procedure is contained in *Playing the Public Inquiry Game: An Objector's Guide* (Le-Las, 1987), which provides much useful advice on preparing statements and presenting evidence.

REFERENCES

Berry, G. (1982) *A Tale of Two Lakes: The Fight to Save Ennerdale Water and Wastwater*, Kendal, Friends of the Lake District.

Boardman, D. (1983) *Graphicacy and Geography Teaching*, London and Canberra, Croom Helm.

Boardman, D. (ed.) (1985) *New Directions in Geographical Education*, London and Philadelphia, The Falmer Press.

Boardman, D. (1987) "Politically controversial issues in the GCSE: the case of nuclear power", *Teaching Geography*, 12(3), 100-104.

Bridges, D. (1979) *Education, Democracy and Discussion*, Slough, National Foundation for Educational Research.

Daniels, S., Harrison, E., Herrington, J. and Slaney, M. (1979) *Exploring Eskdale*, St. Albans, Youth Hostels Association.

Fien, J. Gerber, R. and Wilson, P. (eds.) (1984) *The Geography Teacher's Guide to the Classroom*, Melbourne, Macmillan.

Fien, J. and Slater, F. (1985) "Four strategies for values education in geography", in Boardman, D. (ed.) *op. cit*, 171-186.

Fien, J., Herschell, R. and Hodgkinson, J. (1984) "Using games and simulations in the geography classroom", in Fien, J., Gerber, R. and Wilson, P. (eds.) *op. cit.*, 111-122.

Huckle, J.F. (1985) "Values education through geography: a radical critique', in Boardman, D. (ed.) *op. cit.*, 187-197.

Le-Las, E. (1987) *Playing the Public Inquiry Game: An Objector's Guide*, Mirfield, Osmosis Publishing Services.

Millward, R. and Robinson, A. (1970) *The Lake District*, London, Methuen.

Stradling, R., Noctor, M. and Bains, B. (1984) *Teaching Controversial Issues*, London, Arnold.

Wellington, J.J. (ed.) (1986) *Controversial Issues in the Curriculum*, Oxford, Basil Blackwell.

16: DESERTS - A SEQUENCE OF LESSONS IN PROBLEM-SOLVING

Gosta Wennberg

This sequence of lessons in physical geography has been used mostly with students in grade 7 (age 13-14 years) to show where and why there are arid regions, and at the same time to train the students in problem-solving, inquiry methods and sketch drawing while actively working with maps.

The guided inquiry-discovery method (Robert, 1982) is used in this series of lessons. Accordingly, the unit of work begins with map analysis and explanations rather than with a discussion of the students' own preconceptions or knowledge about deserts, or with motivating illustrations such as slides or reading about life in deserts, etc.

The adoption of such a sequence usually raises intense discussion amongst student teachers and leads to questions and analysis of problems such as the balance between scientism, essentialism, progressivism, etc.

Lesson sequence overview

Lesson 1 demonstrates the inductive method: from reality (here substituted by the map image of a real landscape) the students are asked to draw conclusions about general conditions and processes. In Lesson 2 a discovery method is used: the locality and distributional pattern of arid regions gradually grows into a global picture through map study. In Lesson 3 various models which explain the origin of deserts are taught through the development of sketches which grow in step with the dialogue between students and teacher. In Lesson 4 a deductive method is used: the explanatory sketches may now be used to analyse the distribution pattern of arid regions shown on the map from Lesson 2. Theories about the distribution of deserts are tested.

Lesson 1: Discovery and analysis

1. A lake without outlet

We search for Lake Balkhash in the atlas. The students describe the general appearance, localization and size of the lake and this information is summarized in a sketch drawn on the blackboard; the class progressively copies the sketch in their notebooks. Every step in the procedure is discussed.

Four rivers connected with the lake are found on the map. "Do they run to or from the lake?" A number of students are unsure about the "correct" answer. "How can you tell the direction of a river from the map?" Still there is some uncertainty, but some will answer: "By the colours for altitude (or by the isolines)". Swedish school maps normally use green for 0-200 metres above sea level and yellow for 200-500 metres etc.

We find that the lake is about 500 kilometres in length (equivalent to the distance from Stockholm to Copenhagen or from Melbourne to Hobart), that all four rivers run to the lake and that the longest river is about 900 kilometres (equivalent to the Rhine or the Murray). There is some astonishment at the size of this seemingly small part of the USSR.

We also find that the lake lies between the 200-500 metre level and that the longest river has its source somewhere at the 3000 metre level. Now the crucial question is put: "All the rivers run to the lake, it has no outlet. How can that be?". I have got some seemingly inconsistent and unexpected answers to this, e.g.: "It's not filled with water yet", or "The water maybe seeps out from the bottom".

I wisely avoid critizising such answers. There are several reasons for this. In the first place there are lakes which are "not filled yet" such as the Dead Sea which had an outlet during the Ice Ages but will probably once again rise to an outlet during a future pluvial period. In addition, there are small lakes in Sweden in glacio-fluvial gravel without in- or outlets, their levels changing with that of the ground water.

More importantly, however, such answers show student preconceptions about landscape elements and processes. The landscape "is there", a lake just exists. Obviously, many teachers have not succeeded in raising the children's curiosity or awareness about such things in spite of six years of previous schooling.

Eventually, the correct answer appears during the discussion: "Because the evaporation is so great where the lake is." But why does evaporation exceed precipitation? We come to the conclusion that precipitation must be small and temperature probably high in this region. The lake must lie in a dry region, maybe a desert.

We make a note about this, using the concepts of aridity and desert. Now the moment has arrived for consulting thematic maps: Lake Balkhash is shown to lie in an area of desert scrub. The notebook sketch is now completed. The class propose a suitable title for the sketch and other labels and descriptions. The result may look like Figure 16.1.

One explanation for this didactic problem may lie in children's stages of development as proposed by Piaget or Bruner. More often the answer lies in the teacher's inadequate understanding of how to bridge the gap between map and landscape within the child's mind, or worse, a failure even to be aware of any problem.

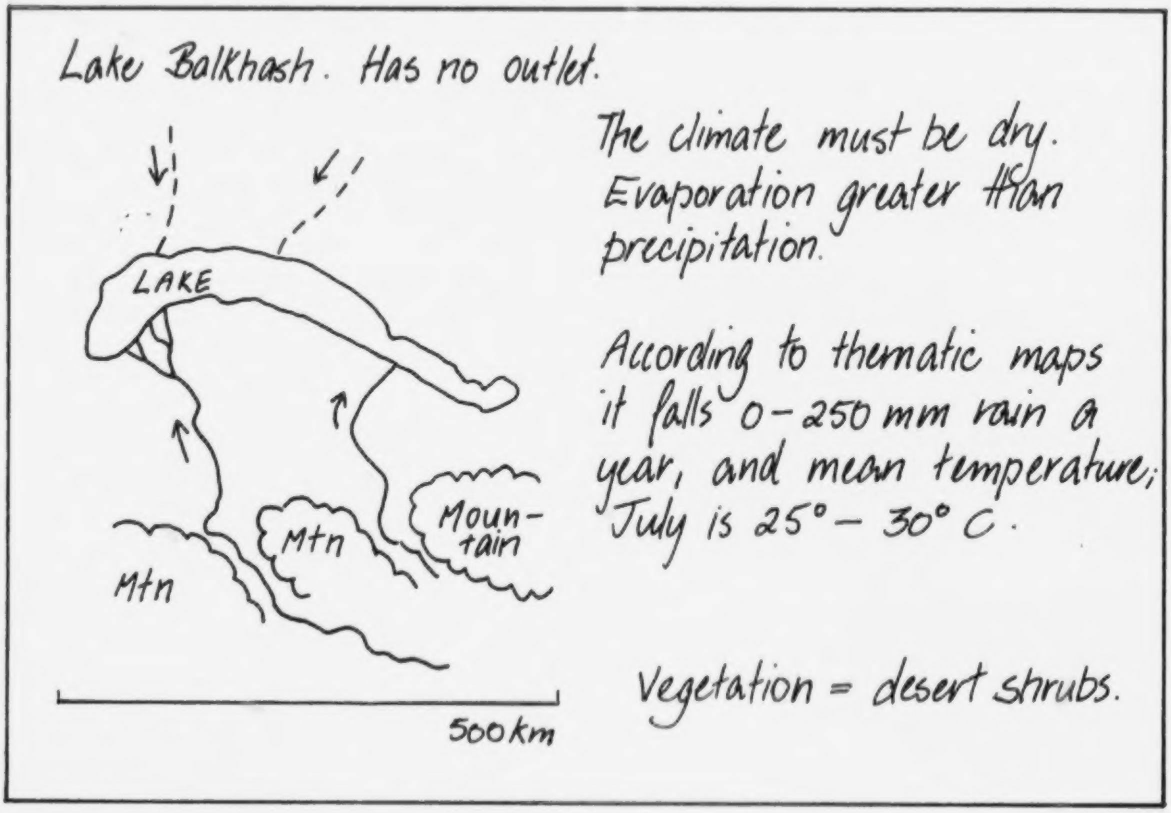

Lake Balkhash. Has no outlet.
LAKE
Mtn
Mtn
Moun-tain
500 km
The climate must be dry. Evaporation greater than precipitation.
According to thematic maps it falls 0-250 mm rain a year, and mean temperature; July is 25° - 30° C.
Vegetation = desert shrubs.

Figure 16.1 A blackboard sketch map of Lake Balkhash

2. Children's preconceptions

The problem of children's preconceptions of landscapes and their "misunderstandings" have many aspects. Many students' answers show that they do not understand the connection between map symbols and reality, e.g. symbols for elevation and the relief of a real landscape. Consequently, they do not understand the connection between the flow of a river and the landscape gradient, i.e. that the river must flow downhill.

It seems that the symbol image of reality on the maps lives its own life in the imagination of many students. Connections with reality are not necessarily established through school work with maps. One author has put it this way:

"I was good at drawing maps, although I never connected them with real places; they represented just a flat peopleless world." (Barbara Comyns in *The Skin Chairs*)

For these reasons an active dialogue between class and teacher over map analysis is important; a dialogue where the teacher should be most keenly aware of how children answer and why; of how their answers may show their misconceptions of reality.

Such preconceptions may arise from the child's own primary experience and reasoning as well as from remarks by parents and others around the child. Marton (1981) has coined the term "phenomenography" for the study of such preconceptions and their confrontation and relationship with the qualitatively different conceptions (explanatory models or hypotheses) that are taught in school.

Lesson 2: Studying the distribution of deserts

The students now work in pairs or individually to show all arid areas on a worksheet map of the world. The instructions may be expressed as follows: "Search for areas with desert and desert scrub on the thematic maps of climate and vegetation of each continent. Draw these areas on the worksheet map with contours and colour them yellow, or use hatching".

This type of map work trains the children to observe distributional patterns of phenomena in different parts of the world and to build a mental image of these patterns. The completed map over global distribution of arid areas is then used as a basis for analysis in Lesson 4, which gives the work extra meaning and purpose.

Extra tasks are needed since students' abilities to work differ. These tasks should deal with desert conditions, e.g. finding other lakes without outlets, mapping them and observing their connection with arid areas, or mapping wadis (if shown in the atlas). Another task might be to put all places found in deserts on the world desert map (Riyadh, Yarkand, Ain Salah, Lima and others) and discuss how they can get any water (from rivers or from ground water). This discussion may then lead to the definition of the term "oasis". A more simple task is to search for local names of different deserts: Sahara, Takla Makan, Atacama, Kalahari, Namib, and so on.

Besides demonstrating the principles of regional distribution, this kind of global distribution mapping trains students' abilities to recognize the general world pattern of continents and oceans, to observe their relations to latitude and longitude and to learn names of places and rivers by using them during meaningful work.

Lesson 3: Analysis of cause and effect

For this lesson, the class should have some previous knowledge about climates such as the different causes of precipitation, the rain shadow effect, the planetary wind system and the global distribution of highs and lows, and ocean currents.

1. Explaining causes of different desert types

The teacher and the class once again work together making blackboard and notebook sketches and notes. Their objective is to discover the explanation for three desert types with different distribution patterns.

Firstly, a sketch is drawn showing the equatorial or trade wind circulation system. Using previous knowledge the students explain the processes involved step by step. We state that air sinks in the subtropical heights at about 30 degrees latitude, that this sinking air will be dry (and discuss why) and that the tradewinds leaving the highs will at first be dry as they move towards warmer areas. Consequently, we get dry areas at about 30 degrees latitude and the Tropics of Cancer and Capricorn. We call this desert type 1. The class suggest headings such as "trade wind deserts, high pressure deserts, tropical deserts, Sahara-type deserts". All suggestions are discussed and written down. We choose the term "tropical deserts" since this is the term used in our textbooks (see Figure 16.2).

For Type 2 we begin with the already well known sketch of orographic precipitation and rain shadow. The process is recapitulated step by step. We then discuss under which conditions the effects of rain shadow may cause arid conditions (temperature, height of mountains etc.). The term "rain shadow desert" is usually suggested at once (see Figure 16.3).

Type 3 is not so easy to understand. We draw a sketch of South America, look for the Peru (or Humboldt) Current on a thematic map and notice that it is cold. Its course is marked on the sketch map. After some discussion we state that humid winds from the Pacific will get cooled over the cold current along the Peruvian and north Chilean coast, causing fog and drizzle (coastal fog being found on another thematic map).

As Peru and northern Chile have a subtropical climate, the air is heated over land giving no rain until the Andes force the air to rise. The result is the Atacama Desert, one of the world's most arid areas, running from about 5 degrees to 30 degrees latitude south. We choose the name "west coast desert" for this type although suggestions such as "cold-current desert" are also presented (see Figure 16.4).

2. The reduction problem

Depending on the age or level of the students, the teacher may have to simplify the explanations, theories or hypotheses presented. There are several pitfalls in this didactic process. Teachers may resort to older and obsolete explanations or theories, finding them simpler to understand for the children. Alternatively, some teachers may themselves lack sufficient knowledge, especially in the case of meteorology and climatology, to be able to choose a good simplification.

One negative consequence of simplified explanations is that students may get the impression that they are being told "the truth" and not realize that they are really being presented with science's more or less up-to-date theory. This risk increases with the lack of knowledge of teacher since teachers with a meagre education in the subject often themselves seem to believe in "textbook truths".

The honest and effective way out is to tell the class that many explanations given are simplified and that science's view of the matter is rather too complicated to be taught directly. In short, that there is a lot more to know and explore than school can give.

My three explanations of desert types should be considered as examples of simplifications, all of which are of course open to criticism.

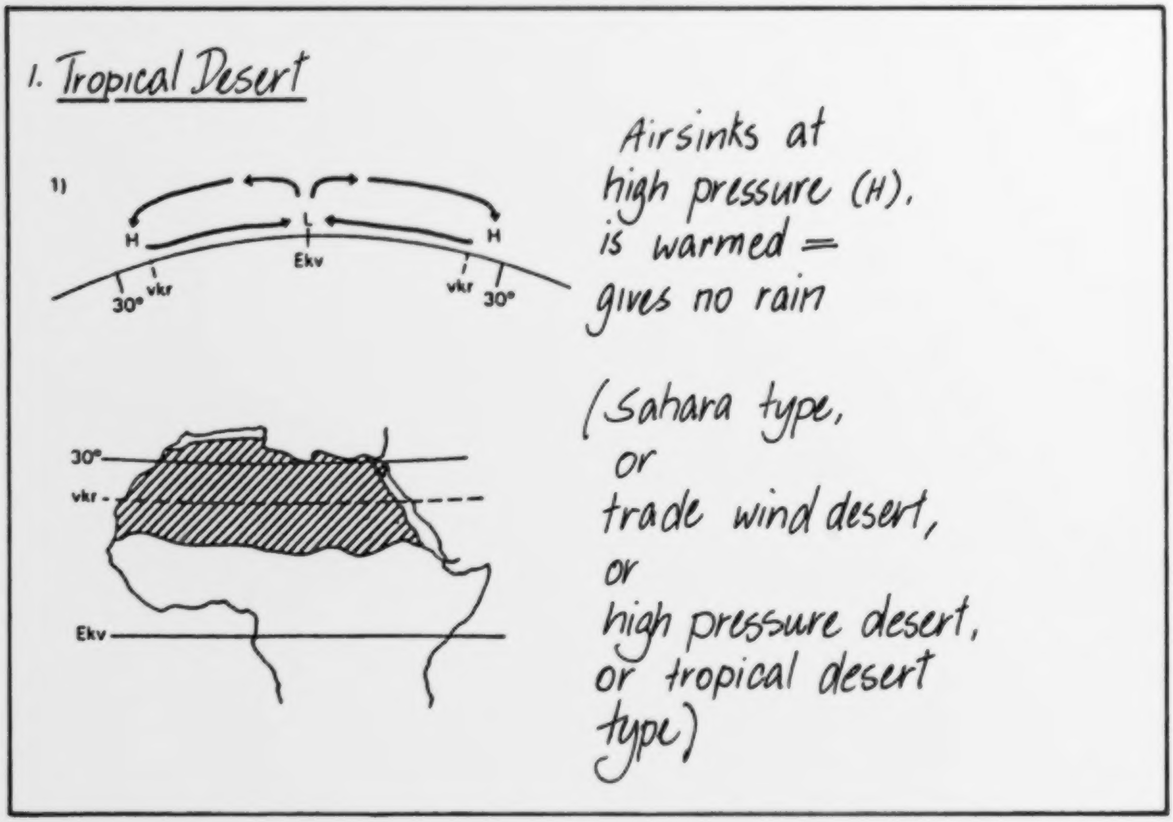

1. Tropical Desert
1)
H
L
H
Ekv
30°
vkr
vkr
30°
Airsinks at high pressure (H). is warmed = gives no rain
30°
vkr
Ekv
(Sahara type, or trade wind desert, or high pressure desert, or tropical desert type)

Figure 16.2 Blackboard sketch to show the location of a tropical desert

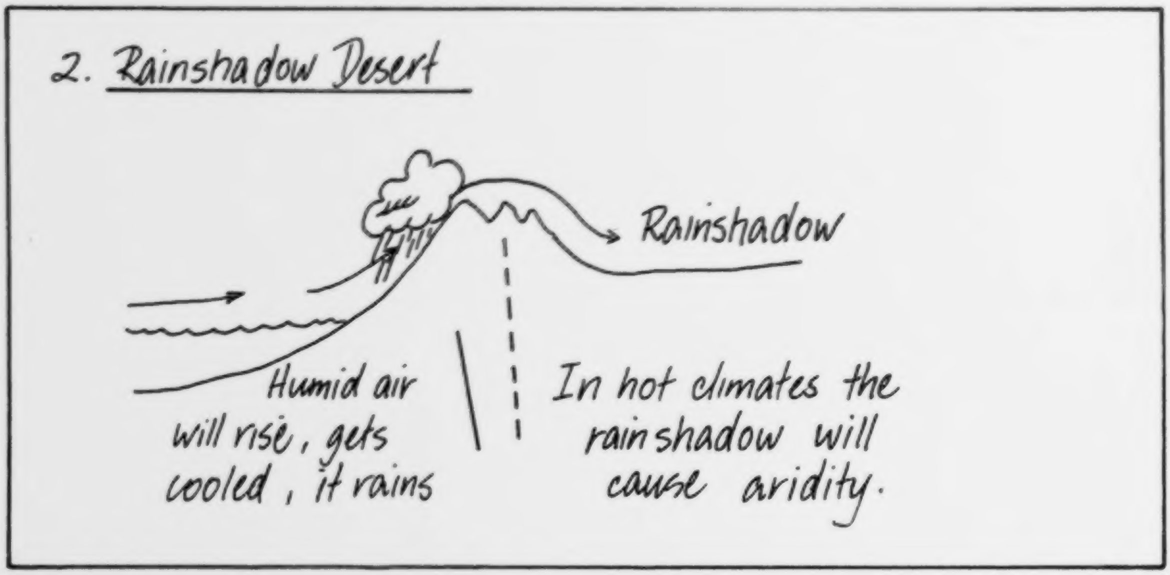

2. Rainshadow Desert
Rainshadow
Humid air will rise, gets cooled, it rains
In hot climates the rainshadow will cause aridity.

Figure 16.3 Blackboard sketch to illustrate a rainshadow

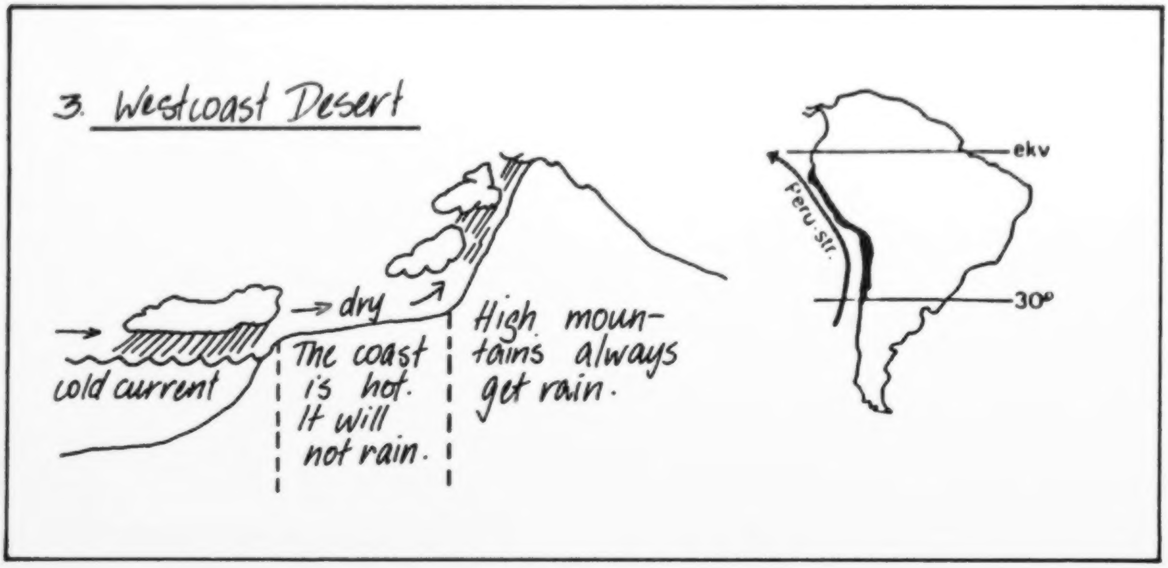

3. Westcoast Desert
dry
cold current
The coast is hot. It will not rain.
High mountains always get rain.
Peru-str.
ekv
30°

Figure 16.4 Blackboard sketch to illustrate a west coast desert

Lesson 4: The application of gained knowledge

1. Deduction: combining explanations with distributional patterns

Now the task is to test if the explanations given can be used to analyse the pattern on the distribution map from Lesson 2. The students solve this problem working in pairs. My experience is that normally all pair groups manage to solve the problem of noting the correct type number to all arid areas on map; although of course there are marked differences in ability which shows in both the length of time needed and the depth of answers given.

Insecure or weak students often ask: "I don't know how to begin". Given some help with guessing the type for Sahara, they normally solve the rest without much help. (There is, however, always the risk of piloting students).

After a while, a few clever students usually ask: "Could a single desert be explained in more ways than one?" The answer is of course, Yes. Namib and Kalahari, for example, are at the same time a west-coast, a tropical and also in a sense a rainshadow desert (the Drakensberg Mountains giving rainshadow from the trade winds. The same goes for parts of the Atacama Desert).

It sometimes happens that very observant students ask about the Somali Desert, for which none of the proposed explanations are suitable. The explanation given in literature is that the NE-SW coastline is parallel with the summer SW monsoon and the winter NE monsoon (and also the trade winds). The winds thus run parallel with the coast and seldom give rain on land.

Such findings help to undermine the students' belief in "the one and correct answer", especially as there is no simple answer as to which of the three explanations should be put foremost in the case of Namib, for example.

2. Notebook sketches or ready made worksheets?

It should be obvious from what has been said so far, that the students' own sketches and notes are central to the proposed method of working. However, with Lesson 4 problems arise. Not all students write or draw well and some notebooks get very messy. What happens is that when sketches from Lesson 2 and 3 are used as the basis for deductions in Lesson 4, the messy and maybe partly illegible notes are an added obstacle, especially for the less able children.

In order to give all students the same starting-point I have prepared a readymade worksheet showing the distribution map and the three explanatory sketches. The worksheet is not distributed until Lesson 4 begins. Students often ask: "Why did we do all the drawing when you had this prepared all the time?" My answer is usually: "It's well known that you learn better if working with your hands and with your head at the same time, as when learning languages or maths. Also, the ability to draw sketches comes in handy in many professions."

I should mention quite another consequence of the use of readymade worksheets. I published a short version of this suite of lessons some years ago, together with the readymade worksheet. Frequently, teachers copied the worksheet and shortened the procedure into one lesson equivalent to Lesson 4. In this way, the intention that the students should participate in all the stages of the discovery - enquiry - induction - deduction - process was thwarted and consequently the opportunity was missed.

3. Step by step reasoning, pair groups, and the risk of piloting

I have recommended a method of step-by-step reasoning for Lessons 1 and 3. Hammersley (1977) has shown that there are objections to this. When students face a difficult problem, the teacher breaks it down into small steps. Thereby, says Hammersley, "the teacher is shaping the pupil's answer into 'the right answer' rather than exploring the pupil's thinking."

Lundgren (1977) has made a similar analysis of the question-answer pattern and calls the phenomenon "piloting". Lundgren's research on mathematic problems suggests that frequently the student guesses stepwise and never reaches an understanding of the principal structures of problems and problem-solving strategies. In addition, the student often gives only partial answers, for the 'all-knowing' teacher to fill in.

I am aware of this risk, and the strategy behind Lessons 2 and 4 is intended to counter the problem by letting the students solve problems on their own. In the pair groups the problem may reappear, however, in that the weaker student of a pair group is piloted by the more active or more able student. In any case, pair groups should function better than groups of 3 or more students, where the risk of piloting and also of slack students not participating actively is greater.

Follow-up sequence

1. Photographs and narratives

As mentioned earlier, it is important to bridge the gap between the abstract map and the concrete environment. Primarily this is done by showing slides of differing desert landscapes. These are discussed and analysed in great detail and the children are always given the chance to observe and comment first.

As a second step I have read aloud to the class from travel books and fiction (e.g. Saint Exupery, T.E. Lawrence, Sven Hedin and others) and then discussing the passages.

Many teachers maintain that such didactic elements should initiate the presentation of deserts and desert concepts for children. My motive for not doing so is that during the first lesson the class should be unaware that deserts are the theme. The whole idea of this first lesson is that reasoning around map findings should lead the students to come to conclusions about arid areas.

2. Towards 'real problem-solving'

Kohn (1982) distinguishes between real problems on the one hand and discipline-orientated or academic problems on the other. He defines real problems as arising from areas of concern to the students. In the context of deserts, accelerating desertification and the Sahel problem represent such real problems.

According to Kohn, however, such issues are not immediate 'real problems' to school-children. They do not immediately concern the children's problems or experience. To make the students feel that these matters are of vital interest to them is one of the teacher's central tasks.

My proposed sequence of desert lessons is, of course, discipline-orientated or scientistic in approach, whereas Kohn points to the necessity of a child-centered and even reconstructivistic approach (Gilbert, 1984; and Englund, 1986).

My own way out of this dilemma has been to teach the sequence proposed here first and to let my students tackle the larger issues of environment and survival at a later time. For teachers with a strongly progressive and child-centred approach the choice might instead be to cut out the basic discipline-orientated content of the course and instead begin directly with the 'real problems' in Kohn's sense. Such a choice of course content is sometimes advocated for physical geography in school as a whole: not to be studied in itself but as an ingredient in the active study of chosen 'real problems'.

Perhaps there is no simple solution to the didactic problem of choosing content and methods but rather a question of achieving a pragmatic balance between scientism, progressivism and reconstructivism.

REFERENCES

Englund, T. (1986) *Curriculum as a political problem, Changing educational conceptions, with special reference to citizenship education*, Uppsala/Lund, Studentlitteratur Chartwell-Bratt.

Gilbert, R. (1984) *The impotent image: Reflections of ideology in the secondary school curriculum*, London and Philadelphia, The Falmer Press.

Hammersley, M. (1977) "School learning: the cultural resources required by pupils to answer a teacher's question", in Woods and Hammersley (ed.), *School Experience*, New York, St. Martins's Press, 57-86.

Kohn, C.F. (1982) "Real problem-solving", in Graves (ed.), *New Unesco Source Book for Geography Teaching*, Longman/The Unesco Press.

Lundgren, U.P. (1977) *Model analysis of pedagogical processes*, Lund, Gleerups.

Marton, F. (1981) "Phenomenography - describing conceptions of the world around us", *International Science*, 10, 177-200.

Robert, B. (1982) "Approaches to teaching and learning strategies", in Graves (ed.), *New Unesco Source Book for Geography Teaching*, Paris, UNESCO.

17: THE DEVELOPMENT OF ABILITIES AND SKILLS THROUGH THE INTEGRATED GEOGRAPHY SYLLABUS IN UGANDA

Erisa Kyagulanyi

This paper describes the integration of area studies, geographical concepts and geographical skills in the Ugandan syllabus documents for Secondary 'O' level pupils (aged 13-16 years). Although a Ugandan teacher may devote one lesson or more to a specific skill or branch of physical/human geography, an integrated approach is encouraged by the Geography Teaching Syllabus (Ugandan Ministry of Education, undated) to reflect the nature of the subject as a coherent discipline.

Fears for the disintegration of the discipline have been expressed elsewhere (Abler, 1977; Gregory, 1978; Johnston, 1983). The integrated geography curriculum adopted in Uganda is based on a concentric syllabus in which a theme is studied several times but in different contexts. For example, in senior classes 1 and 2, pupils study farming in their local area and then study farming in selected areas of South America, Australasia, Asia, etc. In S3-S4, the pupils study farming in their local districts, East Africa, the rest of Africa and then study examples of farming from the Developed countries of the northern hemisphere. In all these topics, the concepts pertaining to farming are gradually developed. Similarly, skills pertaining to mapwork, photographic interpretation and statistical methods are also developed in the concentric framework, thus allowing the pupils to develop these skills gradually according to their levels of physical and mental development. The integrated curriculum has the advantage of being taught through a variety of (short) activities which motivate pupils to participate fully in lesson development without being over-taxed.

The terms "Ability" and "Skill" are interrelated insofar as they refer to doing something well. However, the term "ability" implies greater emphasis on the potentiality of doing something whereas "skill", implies doing something well. Teachers find it useful to relate the development of abilities and skills to the children's stages of growth and development following Piaget's model (Beard, 1969). Piaget's model has been applied in detail to geography teaching elsewhere (Graves, 1980: 167-177; Treadaway, 1985: 187-189).

By the time children join Senior 1 (13 years), they are approaching the stage of Formal Operational Thinking which will enable them to work at higher levels of abstraction. The implication for teachers of such pupils is that both lower and higher levels of thinking should be developed at this time. Lower levels of thinking are best developed through descriptions whereas higher levels of thinking involve reasoning and explanations. Alternatively, since most learning problems in geography are associated with conceptualization and logical thinking (Graves, 1980), it may be desirable to develop concepts at a lower level based on theoretical definitions.

Careful preparation for the development of concepts pertaining to the different aspects of geography is important. Figure 17.1 is taken from the Ugandan syllabus document (Ministry of Education, Uganda), for classses S1 and S2. It provides teachers with examples of how concepts relating to weather and climate, landforms and human geography may be integrated in a teaching syllabus. The content matter of the three fields of geography is listed in their respective columns. The integration of skills related to language, maps and graphics and values and attitudes is left to the teacher and will depend on the resources available. For teaching purposes, the teacher has to follow the area and for each given area s/he may develop the key concepts shown and include others to achieve effective integration.

The sample study textbooks give rich examples of integration and development of a variety of skills but even in these, a teacher has to adapt the material to his or her local situation.

Implementation

Assuming that a teacher is going to teach in a school in Buganda, he may decide to begin by teaching from Chapter 5 of the set text book. This is reproduced as Figure 17.2.

The basic theme of this chapter is farming. It may not be possible to cover both peasant farming and modern dairy farming, so the teacher may concentrate only on 'peasant farming in Buganda'. The basic objective of the teacher would be to help pupils develop the appropriate concept of peasant farming in the region. Since the teacher follows an integrated curriculum, he or she will also wish to develop other skills associated with mapwork, photographic interpretation, statistics and language. The lesson may proceed as indicated below.

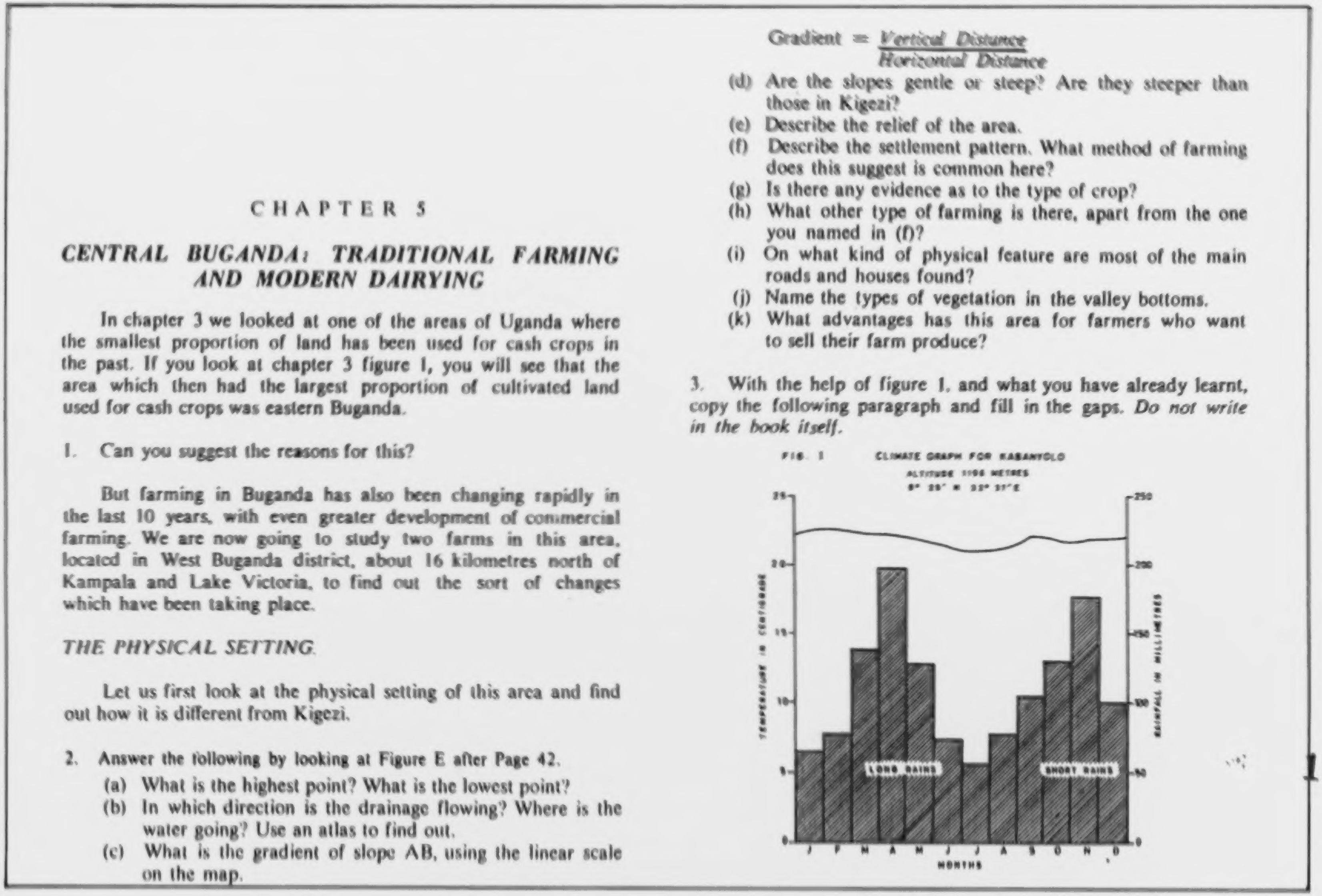
SYSTEMATIC LIST OF TOPICS IN S1 — S2 SYLLABUS				
AREA		**WEATHER AND CLIMATE**	**LANDFORMS**	**HUMAN GEOGRAPHY**
Local Area		Observation, Recording and descriptions of weather. Characteristics of local climate Causes of rain. Convectional rainfall	Observation and recording	Observation and recording
Amazon Basin		Equatorial climate		Forests
Brazil				Coffee World trade in coffee
Pampas				Cattle rearing Importance of marketing
Andes		Temperature and altitude — basic ideas	Fold mountains	Mountain environments Soil conservation Effects of altitude
Chile				Density of population
Chile		Round earth etc. Day and night Temperature and latitude		
Australia	1.	Isotherms and Isohyets	Artesian basins	Extensive farming Sheep and cattle
	2.			Plantation farming
	3.	Relief rain and rain shadow	Rivers in mountain areas	H.E.P. irrigation
	4.			Iron and steel industry Location of industry
	5.			Type of mining
	6.			Town study Port study Communications
New Zealand	7.	Earth's movement round sun and tilting of axis Idea of the seasons		
	8.			Fruit farming Dairying Importance of exports
India	1.	Pressure and winds Land and sea/lake breezes Monsoons and monsoon climate	Flood plains and deltas	Rice
	2.			Irrigation
	3.	Causes of variation of temperature with altitude		Tea Plantations World tea trade
Malaya				Rubber World rubber trade
Java			Volcanoes	Terraced farming
Singapore				Port study Entrepot
China	1.			Communes
	2.			Development of industry
	3.			Port study Entrepot
Japan	1.			Intensive farming
	2.			Development of industry, Importance of trade
	3.			Large urban area

Figure 17.1 The topics taught to the two senior geography classes in Ugandan secondary schools.

SYSTEMATIC LIST OF TOPICS IN S1 — S2 SYLLABUS

AREA		WEATHER AND CLIMATE	LANDFORMS	HUMAN GEOGRAPHY
	4.		Volcanoes and earthquakes	
Middle East	1.		Formation of oil	Oil trade
	2.			Irrigation Kibbutz
USSR	1.	Latitude and longitude Time Heating of land and sea Continentality and continental climate		Coniferous forests
	2.			Collective farming
	3.			Mining and industry
Britain		The seasons — causes		Intensive commercial farming
Denmark				Cooperative farming
Holland			Coastal deposition	Land reclamation
Mediterranean		Mediterranean climate		'Mediterranean' farming
Switzerland			Upland glaciation	Tourism Communication problems
Norway		Maritime climate	Fjords, Drowned coasts North Atlantic drift	Fishing
Sweden		Length of day and night Tundra climate		Mining types Iron ore
Britain				Coal
London/Paris				Large cities Light industrial
Ruhr				Coal
Europe				Importance of trade
North America	1.	Continental climate The season — causes		Extensive mechanised farming
	2.			Extensive pastoral farming
	3.			Intensive farming, Market gardening
	4.		Soils and soil erosion	Land reclamation and soil erosion
	5.	Mediterranean climate		'Mediterranean' farming
	6.	Length of day and night Tundra climate	North Pacific current	Mining types Iron ore
	7.	Maritime climate	drowned coasts	Fishing
	8.			Coal Location of industry
	9.			Large cities Light industries
	10.			Types of transport Importance of trade

Figure 17.1 (Continued) The topics taught to the two senior geography classes in Ugandan secondary schools.



CHAPTER 5

CENTRAL BUGANDA: TRADITIONAL FARMING AND MODERN DAIRYING

In chapter 3 we looked at one of the areas of Uganda where the smallest proportion of land has been used for cash crops in the past. If you look at chapter 3 figure 1, you will see that the area which then had the largest proportion of cultivated land used for cash crops was eastern Buganda.

1. Can you suggest the reasons for this?

But farming in Buganda has also been changing rapidly in the last 10 years, with even greater development of commercial farming. We are now going to study two farms in this area, located in West Buganda district, about 16 kilometres north of Kampala and Lake Victoria, to find out the sort of changes which have been taking place.

THE PHYSICAL SETTING.

Let us first look at the physical setting of this area and find out how it is different from Kigezi.

2. Answer the following by looking at Figure E after Page 42.
   - (a) What is the highest point? What is the lowest point?
   - (b) In which direction is the drainage flowing? Where is the water going? Use an atlas to find out.
   - (c) What is the gradient of slope AB, using the linear scale on the map.

$$\text{Gradient} = \frac{\textit{Vertical Distance}}{\textit{Horizontal Distance}}$$

   - (d) Are the slopes gentle or steep? Are they steeper than those in Kigezi?
   - (e) Describe the relief of the area.
   - (f) Describe the settlement pattern. What method of farming does this suggest is common here?
   - (g) Is there any evidence as to the type of crop?
   - (h) What other type of farming is there, apart from the one you named in (f)?
   - (i) On what kind of physical feature are most of the main roads and houses found?
   - (j) Name the types of vegetation in the valley bottoms.
   - (k) What advantages has this area for farmers who want to sell their farm produce?

3. With the help of figure 1, and what you have already learnt, copy the following paragraph and fill in the gaps. *Do not write in the book itself.*

FIG. 1 CLIMATE GRAPH FOR KABANYOLO

ALTITUDE 1196 METRES

0° 20' N 32° 37'E

Figure 17.2 An extract from *Uganda: Studies in Development* by J Treadaway, 1974.

THE KABANYOLO AREA

Kabanyolo has a total rainfall of . . . cms. mainly because it is only . . . . kilometres from Lake Victoria, which supplies the winds with moisture. As there are . . . . months with less than 50 mms. of rain there is no real . . . . season, so water for the crops is no great problem. But there are . . . . seasons of heavier rainfall. . . . . and . . . . are the months with the highest rainfall. This double maximum is caused by increased . . . . rainfall when the sun is passing . . . . , and also by winds blowing from . . . . The highest temperature is . . . . in the month of . . . . , the lowest temperature is . . . . in . . . . and the annual range is therefore only . . . . Even though Kabanyolo is only . . . . minutes north of the equator, the mean annual temperature is . . . . This is much lower than the mean annual temperature at Mombasa, which is 26.1°C. The reason for the lower temperature is the . . . . Kabanyolo is . . . . metres above sea level.

The area consists of many . . . . separated by valleys containing . . . . These valleys have . . . . sides, ideal for building and cultivation. There is no fear of . . . . erosion and machinery is often used.

4. (a) Write a brief comparision between the climate and relief of the Kabanyolo area and that of southern Kigezi.
   (b) In what ways does the relief of the Kabanyolo area make farming easier than in southern Kigezi?

A TRADITIONAL FARM

In this physical setting the Baganda have developed methods of farming which are in most ways as intensive as those in Kigezi.

5. Mrs. Nakijoba has a small farm in this area. It is marked on figure E. Describe its position in relation to other features on the map.

6. Below is a map of Mrs. Nakijoba's farm, figure 3, a number of photographs of this farm, figures 4-9, and a translated report of a conversation between Mrs. Nakijoba and Alex, a student from Gayaza High School. If you use these you should be able to imagine you have visited the farm yourself. There are some questions next to each of the photographs to help you. Write a description of the farm and the methods of farming used, mentioning the following — size, type of land, natural vegetation, crops grown, seasonal activities, methods of cultivation, cash crops, sale of crops, tools, house building and anything else you consider important. Try also to suggest how the farming in this area is related to the physical conditions you have already learnt about.

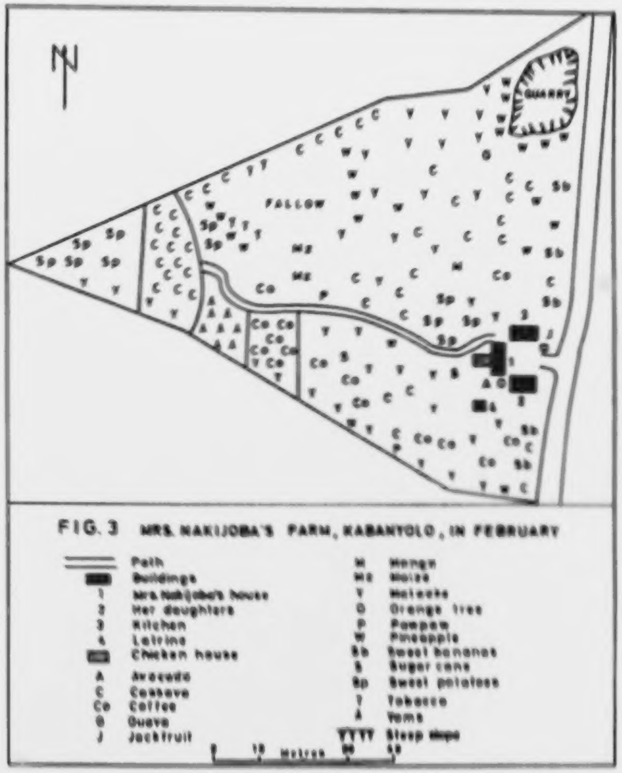
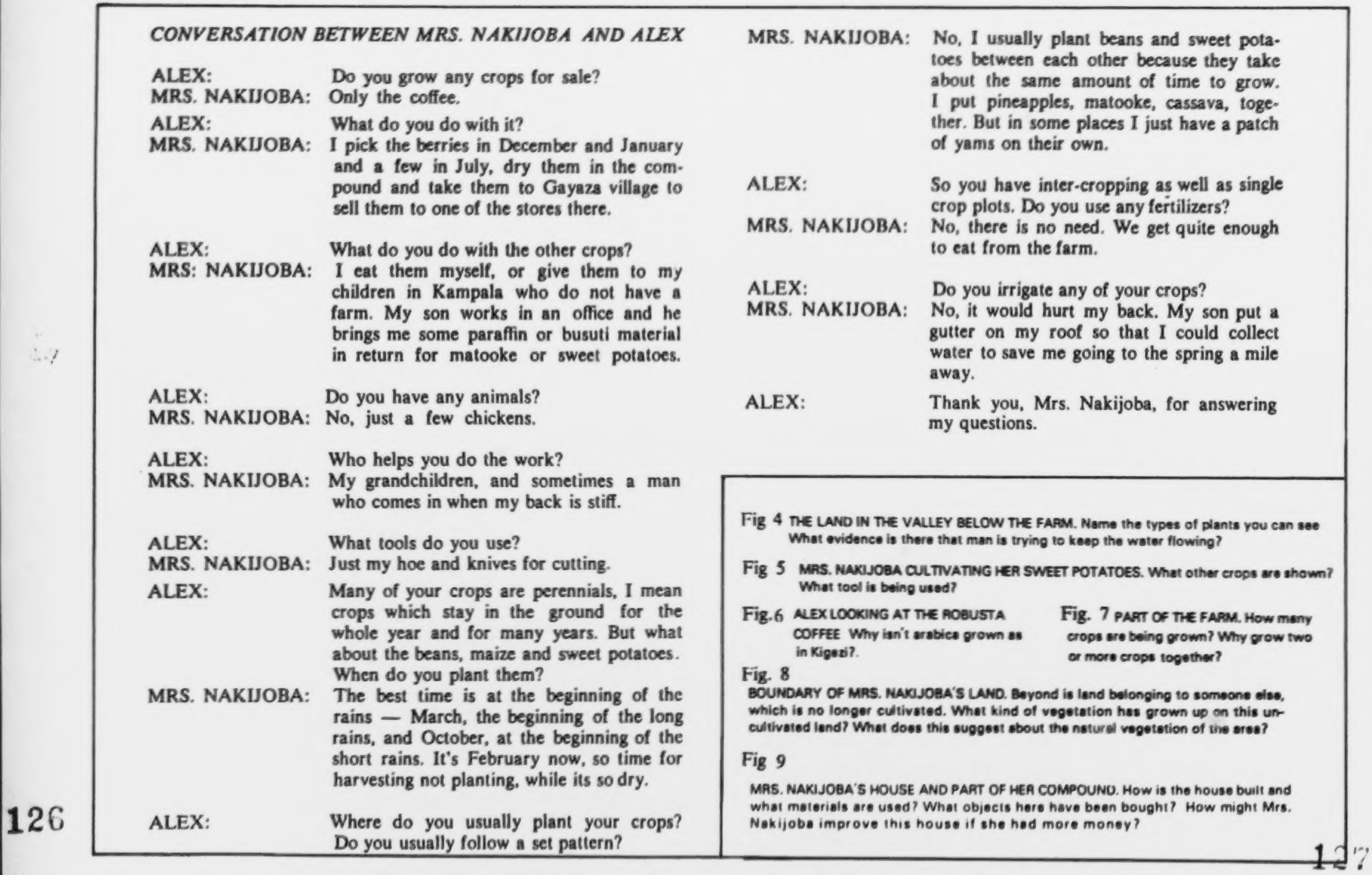


FIG. 3 MRS. NAKIJOBA'S FARM, KABANYOLO, IN FEBRUARY

Figure 17.2 (Continued) An extract from *Uganda: Studies in Development* by J Treadaway, 1974.



CONVERSATION BETWEEN MRS. NAKIJOBA AND ALEX

ALEX:	Do you grow any crops for sale?
MRS. NAKIJOBA:	Only the coffee.
ALEX:	What do you do with it?
MRS. NAKIJOBA:	I pick the berries in December and January and a few in July, dry them in the compound and take them to Gayaza village to sell them to one of the stores there.
ALEX:	What do you do with the other crops?
MRS: NAKIJOBA:	I eat them myself, or give them to my children in Kampala who do not have a farm. My son works in an office and he brings me some paraffin or busuti material in return for matooke or sweet potatoes.
ALEX:	Do you have any animals?
MRS. NAKIJOBA:	No, just a few chickens.
ALEX:	Who helps you do the work?
MRS. NAKIJOBA:	My grandchildren, and sometimes a man who comes in when my back is stiff.
ALEX:	What tools do you use?
MRS. NAKIJOBA:	Just my hoe and knives for cutting.
ALEX:	Many of your crops are perennials, I mean crops which stay in the ground for the whole year and for many years. But what about the beans, maize and sweet potatoes. When do you plant them?
MRS. NAKIJOBA:	The best time is at the beginning of the rains — March, the beginning of the long rains, and October, at the beginning of the short rains. It's February now, so time for harvesting not planting, while its so dry.
ALEX:	Where do you usually plant your crops? Do you usually follow a set pattern?
MRS. NAKIJOBA:	No, I usually plant beans and sweet potatoes between each other because they take about the same amount of time to grow. I put pineapples, matooke, cassava, together. But in some places I just have a patch of yams on their own.
ALEX:	So you have inter-cropping as well as single crop plots. Do you use any fertilizers?
MRS. NAKIJOBA:	No, there is no need. We get quite enough to eat from the farm.
ALEX:	Do you irrigate any of your crops?
MRS. NAKIJOBA:	No, it would hurt my back. My son put a gutter on my roof so that I could collect water to save me going to the spring a mile away.
ALEX:	Thank you, Mrs. Nakijoba, for answering my questions.

126

Fig 4 THE LAND IN THE VALLEY BELOW THE FARM. Name the types of plants you can see What evidence is there that man is trying to keep the water flowing?

Fig 5 MRS. NAKIJOBA CULTIVATING HER SWEET POTATOES. What other crops are shown? What tool is being used?

Fig.6 ALEX LOOKING AT THE ROBUSTA COFFEE Why isn't arabica grown as in Kigezi?.

Fig. 7 PART OF THE FARM. How many crops are being grown? Why grow two or more crops together?

Fig. 8
BOUNDARY OF MRS. NAKIJOBA'S LAND. Beyond is land belonging to someone else, which is no longer cultivated. What kind of vegetation has grown up on this uncultivated land? What does this suggest about the natural vegetation of the area?

Fig 9

MRS. NAKIJOBA'S HOUSE AND PART OF HER COMPOUND. How is the house built and what materials are used? What objects here have been bought? How might Mrs. Nakijoba improve this house if she had more money?

127

Figure 17.2 (Continued) An extract from *Uganda: Studies in Development* by J Treadaway, 1974.

Step 1.

a) The teacher asks guiding questions to introduce the topic. Pupils identify Uganda's leading export crops and they name the predominant type of farming (peasant farming).

b) The teacher may wish to explore the pupils' concept of 'peasant farming'. He may pose some questions: What is 'peasant farming'? (if pupils are unable to give satisfactory definitions, the teacher may simplify the task further). If one talks of 'peasant farming' what does this include? How would you describe a peasant farm?

These activities will assist pupils to develop the skill of concept formation ('peasant farming') by structuring their own experiences.

Step 2.

a) The teacher introduces the sample study.

b) Students do selected questions in number 2 orally, i.e. a, c to k.

Skills involved here include:

i) Concept formation, e.g. dissected plateau, dispersed settlements, and peasant farming (deducing facts from map).
ii) Mapwork, e.g. location description of phenomena.

Step 3.

a) The teacher asks questions to introduce the climatic background.

b) Pupils study a world map of mean annual rainfall. They locate a typical tropical station, e.g. Lagos and they compare its climatic graph with that of Kabanyolo.

c) Pupils identify the factors which are responsible for modifying Kabanyolo's climate.

Skills involved here include:

i) Concept formation, e.g. modified equatorial climate and implications for farming, and
ii) Interpretation of climatic statistical diagrams.

Step 4.

a) The teacher gives a brief exposition about aspects of farming which are not covered in the book such as land tenure, mulching and conservation of moisture.

b) Pupils listen carefuly and identify the characteristics of peasant farming by answering the appropriate question.

c) The teacher makes summaries on the chalk board.

Skills involved here include:

i) Concept formation, e.g. enrichment of concept of peasant farming,
ii) The development of the skill of extracting important information from oral sources (language skill), and
iii) Clarifying values and attitudes, e.g. sympathetic feelings for deprived peasant farmers and the need to modernise peasant farming.

Step 5.

a) The teacher asks guiding questions to help pupils deduce information from the map (Fig. 17.3), selected photographs and from prose (conversation on P.34).

b) Pupils provide information which supplements that already acquired in Step 4.

c) The teacher continues with his chalk board summaries.

Skills involved here include:

i) The further enrichment of the concept of peasant farming, and
ii) practice in deducing information from maps, photographs and prose.

Step 6: Concluding activities.

a) The teacher asks oral review questions to find out whether what he or she had intended to cover has been grasped satisfactorily.

b) Pupils respond accordingly or otherwise are helped accordingly.

c) The teacher assigns a concluding written piece of work to help pupils make notes. This may be in the form of structured notes with missing words, structured questions in which pupils may practise a variety of skills or essay type questions. Examples of all these approaches are given in the extracts (Figure 17.2).

Step 7: Follow-up activities.

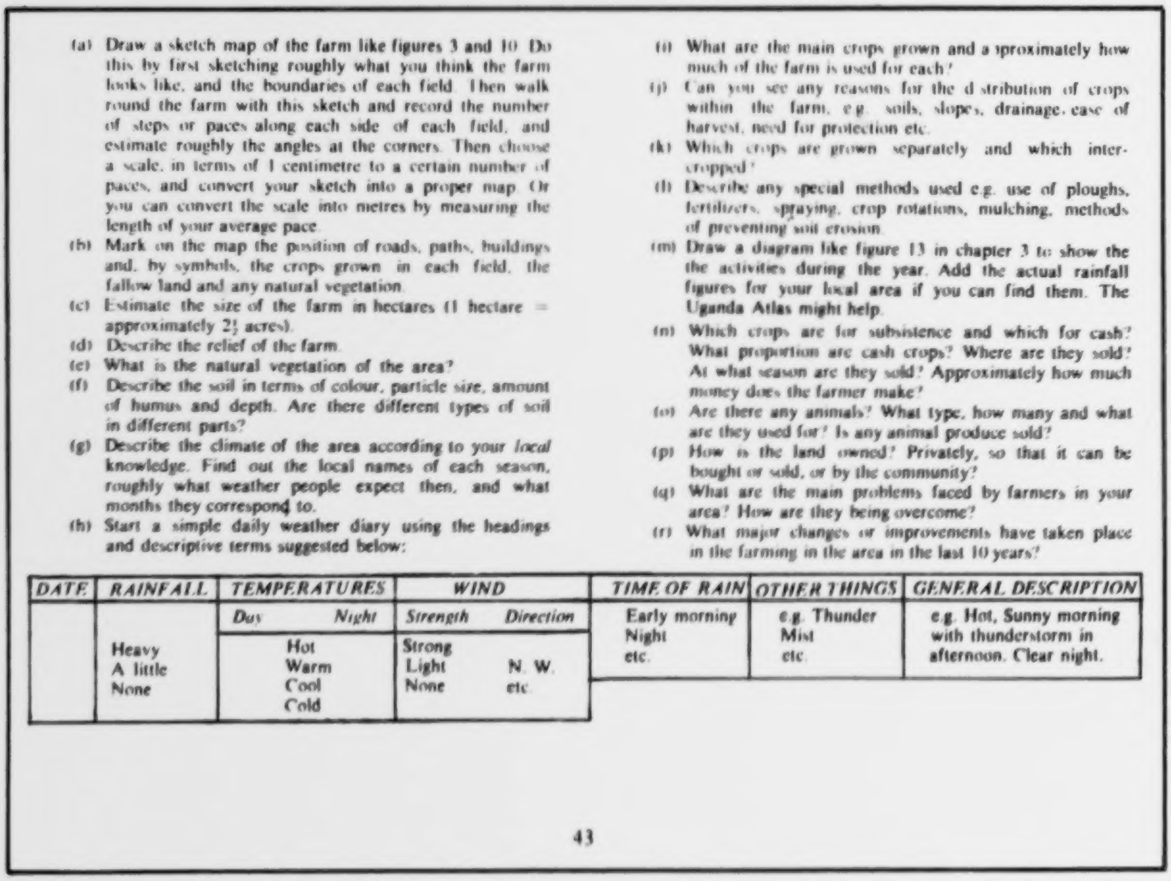
This may take any one of the following forms:

a) Pupils may make their own farm study as suggested in the text book (Figure 17.3).

b) The teacher may organise a fieldwork class in which pupils are guided to compare what they had done in class with what obtains in the field.

c) Pupils may be encouraged to hold a discussion in which they relate the topic to the Ugandan context.

d) Pupils may be assisted to enhance their understanding of the topic through dramatisation.



(a) Draw a sketch map of the farm like figures 3 and 10. Do this by first sketching roughly what you think the farm looks like, and the boundaries of each field. Then walk round the farm with this sketch and record the number of steps or paces along each side of each field, and estimate roughly the angles at the corners. Then choose a scale, in terms of 1 centimetre to a certain number of paces, and convert your sketch into a proper map. Or you can convert the scale into metres by measuring the length of your average pace.
(b) Mark on the map the position of roads, paths, buildings and, by symbols, the crops grown in each field, the fallow land and any natural vegetation.
(c) Estimate the size of the farm in hectares (1 hectare = approximately 2½ acres).
(d) Describe the relief of the farm.
(e) What is the natural vegetation of the area?
(f) Describe the soil in terms of colour, particle size, amount of humus and depth. Are there different types of soil in different parts?
(g) Describe the climate of the area according to your *local* knowledge. Find out the local names of each season, roughly what weather people expect then, and what months they correspond to.
(h) Start a simple daily weather diary using the headings and descriptive terms suggested below:
(i) What are the main crops grown and approximately how much of the farm is used for each?
(j) Can you see any reasons for the distribution of crops within the farm, e.g. soils, slopes, drainage, ease of harvest, need for protection etc.
(k) Which crops are grown separately and which intercropped?
(l) Describe any special methods used e.g. use of ploughs, fertilizers, spraying, crop rotations, mulching, methods of preventing soil erosion.
(m) Draw a diagram like figure 13 in chapter 3 to show the the activities during the year. Add the actual rainfall figures for your local area if you can find them. The Uganda Atlas might help.
(n) Which crops are for subsistence and which for cash? What proportion are cash crops? Where are they sold? At what season are they sold? Approximately how much money does the farmer make?
(o) Are there any animals? What type, how many and what are they used for? Is any animal produce sold?
(p) How is the land owned? Privately, so that it can be bought or sold, or by the community?
(q) What are the main problems faced by farmers in your area? How are they being overcome?
(r) What major changes or improvements have taken place in the farming in the area in the last 10 years?

DATE	*RAINFALL*	*TEMPERATURES*		*WIND*		*TIME OF RAIN*	*OTHER THINGS*	*GENERAL DESCRIPTION*
		Day	*Night*	*Strength*	*Direction*			
	Heavy A little None	Hot Warm Cool Cold		Strong Light None	N. W. etc.	Early morning Night etc.	e.g. Thunder Mist etc.	e.g. Hot, Sunny morning with thunderstorm in afternoon. Clear night.

43

Figure 17.3 Follow-up activities from the set text book (Treadaway, 1974).

Hints on integrating skills and conceptual development

Here are a number of suggestions on how teachers can make the application of different skills more effective in geography lessons.

- All source materials should be adapted to local needs. The imaginary teacher in the above example did not have to follow the textbook strictly.
- Careful planning to ensure that concepts and skills are integrated will help the teacher to cater for pupils with a wide range of abilities. The teacher has to determine the range of skills to be developed - the more unfamiliar they are, the fewer they should be. In exceptional cases, only one skill may be developed in a lesson. The integrated geography syllabus does not only show the coherence of the subject but is also rich in developing a wide range of skills.
- The integrated geography curriculum is so rich to teach that it may not be necessary to make a list of materials. Much emphasis has been put on print sources and there are very many examples of these (Gibbs, 1973; White, 1987; Hayward, 1972; Rushby, 1971; Money, 1984).

Other aids (filmstrips, slides, videos, computer software) would be very useful but we lack these resources in Uganda.

REFERENCES

Abler, R., Adams, J.S., Gould, P. (1970) *Spatial Organization: a Geographer's View of the World*, London, Prentice Hall.
Bensikin, A. (1985) Developing the Further Curriculum Unit: An example of collaboration in physical Geography, *Teaching Geography*, 10 (3), 99-102.
Beard, R. (1969) *An Outline of Piaget's Developmental Psychology*, Routledge and Kegan Paul.
Craig, R.C. (1966) *The Psychology of Learning in the Classroom*, London, Macmillan.
Gibbs, C.W. (1971) *The Rhinelands*, Nairobi, East African Publishing House.
Graves, N.J. (1980) *Geography in Education*, London, Heinemann.
Gregory, D. (1978) *Ideology, Science and Human Geography*, London, Hutchinson.

Hayward, J.R., Boorman, B.L., White, R.G. (1974) *North America: Studies for East African Students*, Kampala, Uganda Publishing House.
Johnston, R.J. (1983) *Geography and Geographers*, London, Edward Arnold.
Magona, A. (1975) *Objective Questions in East African Geography*, Nairobi, Heinemann.
Money, D.C. (1984) *China: The Land and the People*, Evans Brothers.
Rushby, J.G., Bell, J., Dybeck, M.W. (1971) *Study Geography*, London, Longman.
Treadaway, J. (1974) *Uganda: Studies in Development*, *Kampala*: Uganda Publishing House.

Teaching Geography for a Better World

A handbook for teachers of geography due for publication May 1988.

'This important book presents a challenge to all concerned with the teaching and learning of geography . . . The challenge is to examine the geography we currently teach and how we teach it, in order to tease out and explore the ideologies that lie behind what we teach and the way we teach it.' *Michael Naish*

This is a handbook for any geography teacher who is concerned to develop a teaching strategy and a curriculum which addresses issues of current and future global concern: that is, to teach geography 'for a better world'.

It is a practical book, offering detailed guidance, ideas and teaching material presented in an accessible and attractive format for ease of use in the classroom.

The chapters are written by leading geographers from around the world, and most of them appeared in the first Australian edition of this book. For this second 'international edition', the original material has been edited, revised, extended and completely re-designed.

Contents
1. Teaching geography for a better world.
2. Geography and world citizenship.
3. Learning geography: a route to political literacy.
4. The Daintree rainforest: developing political literacy through an environmental issue.
5. Teaching for human rights in geography.
6. Teaching geography in a multicultural society.
7. Engendering a new geographic vision.
8. Limits to geography: a feminist perspective.
9. Third World studies: conscientisation in the geography classroom.
10. The geography of war and peace.
11. Sport in geography.
12. Alternative futures in geographical education.
13. Reflections on teaching geography for a better world.
14. Postscript.

References

200 pages illustrated 0 05 004259 9 $32.95

Edited by
John Fien and Rod Gerber
Produced in conjunction with the Australian Geography Teachers' Association

Teaching Geography for a Better World
is available from your usual educational bookseller.
In case of difficulty please contact:
Mrs Margaret Brown, Longman Cheshire Pty Ltd.,
95 Coventry Street, Sth. Melbourne, Vic. 3205.
Tel: (03) 697 0666

New 'international edition' available from Longman Cheshire

Section C

Developing skills for living through geographical education

18: SKILLS FOR LIVING: A GEOGRAPHICAL PERSPECTIVE

John Fien

"Ah, but I was so much older then,
I'm younger than that now"
(Bob Dylan)

I would have found this paper a whole lot easier to write ten years ago. I was young and brash then and knew little of the pain and joy, difficulties and love that are part of the human drama of living. It was a time, also, when, in Althuser's (1971) terms, I was blind to my ideology and did not question what "skills" or "living" meant and, certainly, I had no doubts at all that I knew what "geography" and "education" were. Ten years on, I am sorer and sorrier but also happier (one of the necessary paradoxes of living, I am told) than I was in 1978 and quite sure that all my definitions of skills, living, geography and education are problematic.

The papers in this section are a good illustration of the range of meanings about skills and various important dimensions of living, and of the relevance of geographical education to them. Some show the role of geography in fostering important learning and employment related skills (such as language, thinking and computing); others illustrate geography's role in fostering international understanding and empathy; while others highlight the contribution of geography to social and political understandings and skills. As such, they illustrate the role of geography as a "medium for education" (Naish, 1980). If we view the aims of geography as supporting the home and society in the development of citizens with the knowledge, skills and values to live autonomous meaningful lives, the contribution of geography as a medium for education can be seen in the life roles it helps people to fulfil.

Part of living happily and successfully involves finding answers to a number of geographical questions and problems as we pursue our various life roles as learners, social beings, recreators, producers, consumers and citizens. Illustrations of the geographical dimensions of these are provided in the statement on *Geography in Secondary Education* prepared by the Australian Geography Teachers' Association (1988):

Learner:	How to acquire information, evaluate and interpret information and to make rational decisions
Social being:	Where to rent or buy a house in relation to family, work and recreation patterns
Recreator:	Where and when to holiday and how to use leisure time for the benefit of self, the community and the environment
Producer:	Where to find work; the effects of various modes of travel to work; and the costs and benefits of environmental controls on industry
Consumer:	Where to shop; alternative transport modes; and whether to purchase goods that might be over-packaged or produced by socially unjust or environmentally unsound means
Citizen:	How to analyse the social and environmental implications of political decisions; evaluate alternative forms of social action; and encourage others to participate with you to conserve the environment and redress social injustice.

Any decisions we make on questions such as these will be based on the geographical knowledge, values and skills we acquire from life's experiences - and some of these may be school studies in geography. Such knowledge, values and skills may be considered one's "personal geography" (Fien, 1979, 1983) and it should be the aim of any curriculum of "geography for living" (and how could one justify any that are not?) to extend and refine the personal geographies of students. Such curricula which would include studies at the local, national and global levels can develop all life roles by encouraging students to become informed, reflective and involved citizens or, what Brown (1971) called thinking, feeling and acting people. In this way, students can be prepared to become more effective in meeting the social and environmental questions, issues and problems encountered in daily life and thus more skilled in their life roles. Although his ideas were not well developed at the time, this is what Pattison (1970) meant when he encouraged the development of a"fulfillment-centered curriculum" in geography with the goal of fostering "being" as equally as much as "knowing" or "doing". These ideas on the role of geography as a medium for education are expressed in model form in Figure 18.1.

1978

I began thinking about the ideas in Figure 18.1 about ten years ago although at that time I did not see "living" or "geography" as broadly defined then as I do now. Then, I saw geography as a spatial science with relevance for

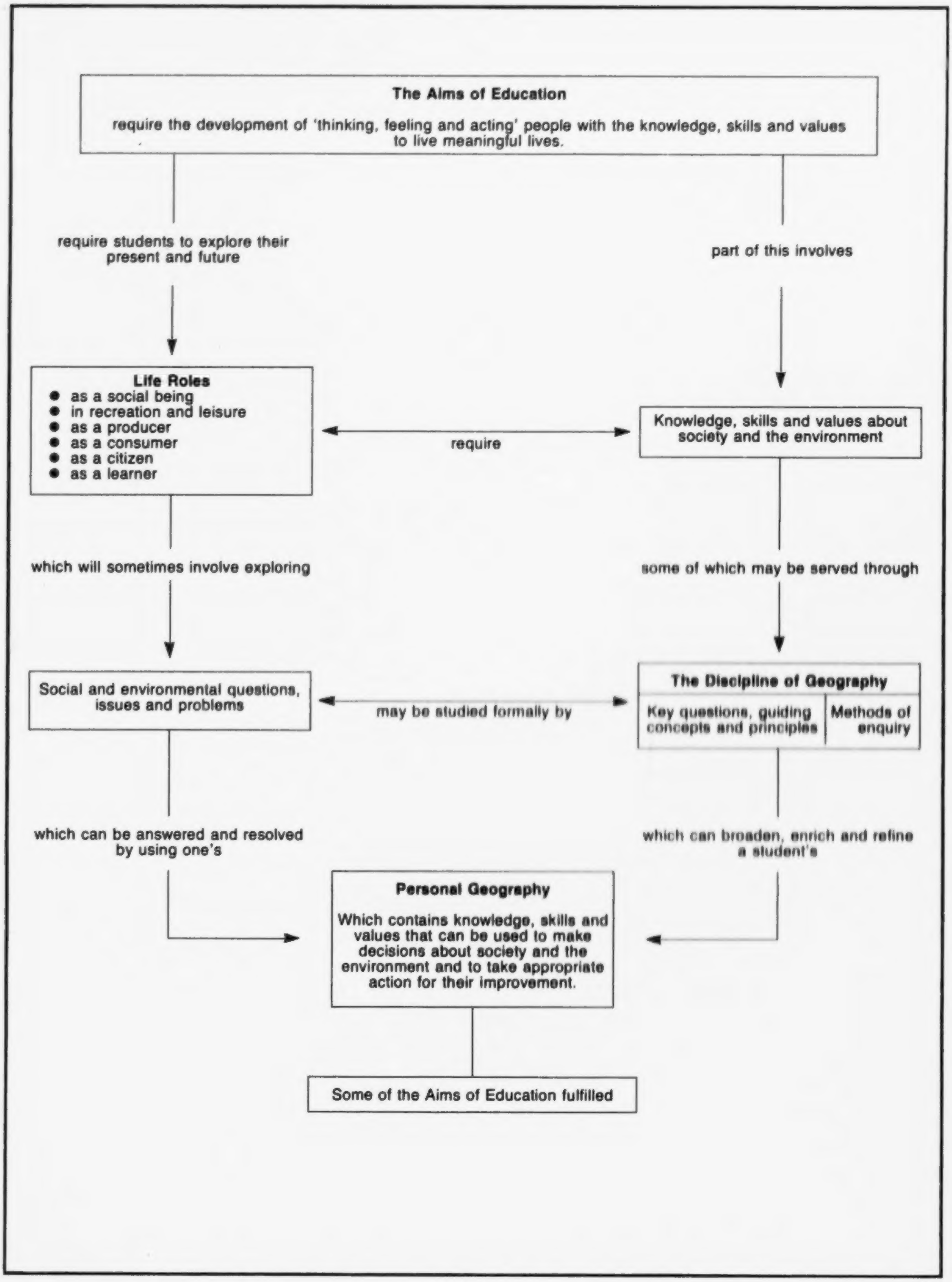

The Aims of Education
require the development of 'thinking, feeling and acting' people with the knowledge, skills and values to live meaningful lives.
require students to explore their present and future
part of this involves
Life Roles
as a social being
in recreation and leisure
as a producer
as a consumer
as a citizen
as a learner
require
Knowledge, skills and values about society and the environment
which will sometimes involve exploring
some of which may be served through
Social and environmental questions, issues and problems
may be studied formally by
The Discipline of Geography
Key questions, guiding concepts and principles
Methods of enquiry
which can be answered and resolved by using one's
which can broaden, enrich and refine a student's
Personal Geography
Which contains knowledge, skills and values that can be used to make decisions about society and the environment and to take appropriate action for their improvement.
Some of the Aims of Education fulfilled

Figure 18.1 Geography's role as a medium for education (Fien, Cox and Fossey, 1988)

human experience. I argued that geography's interest in space and spatial relations had existential roots and stemmed from the human need to comprehend and operate in the milieu that provided the social and environmental context of life and action (Fien, 1979). I saw that the practicalities of daily life demanded realistic environmental perceptions and cognitive records of spatial relationships between people and their environments and that, without such spatial orientations, the performance of many life roles would be impossible. I agreed with Merleau-Ponty (1962) that spatial consciousness is a necessary aspect of human existence or, as he wrote, " We have said that space is existential; we might just as well have said that existence is spatial."

Such beliefs about the nature of geography and its relationship to "living" and "education" led me to place great store by the importance of the mental images (or mental maps) in one's personal geography. The 1970s literature in behavioural and humanistic geography, particularly *Topophilia* (Tuan, 1974), *Place and Placelessness* (Relph, 1976), *Maps in Minds* (Downs and Stea, 1977) and *A Geography of the Lifeworld* (Seamon, 1980), provided valuable insights into the way personal geographies are used both pragmatically to find our way about the environment and qualitatively to make judgements about the location and nature of human activity in the environment (Fien, 1983). Thus, I was encouraged in my teaching to see the publication of *Mental Maps: Resources for Teaching and Learning* (Stoltman, 1980) with its many ideas for helping students explore their personal geographies and refine them for the geographical tasks of everyday life, *Listening to the Learner* (Fink, 1977) and *A Person-Centred Approach to Geography* (Romey and Elberty, 1980) with their practical advice on implementing learner-centred approaches to geography teaching. All this was supported by new research into children's and adolescents' experience of space and place (Lynch, 1977 and Hart, 1980) and a variety of affective strategies for clarifying and interpreting environmental experience (Adams and Ward, 1982, Bartlett, 1984 and Hall, 1984)

1988

Today, I still believe in the importance of developing and refining the personal geographies of students, but only as one part of geography's contribution to providing students with "skills for living". Just as I was becoming comfortable with the programs I was developing for students in behavioural and humanistic geography, I began to realise that there was more to "geography", "education" and "living" than exercises on mental maps, landscape appreciation and sensory walks - important and enjoyable as these may be.

I began to take more interest in the writings of Gregory (1978) and Johnston (1983) on the nature of geography, Whitty and Young (1976), Apple (1979) and Sharp (1980) on the relationship between society and education, and the implications for geographical education that Huckle (1983, 1985), Cook (1983) and Gill (1983) saw in these developments. As a result I found that I had to reconsider my purposes in teaching geography, especially in relationship to the nexus between education, society and everyday life.

1. Developments in geography

The first of these developments that affected me was in the nature of geography. In his important article, *The New Geography - and After?*, Wolforth (1976) drew a parallel between changes in geography and the differences in the general mood of the 1960s and 1970s. With the "global village" ethos dominant in the prosperous and optimistic 1960s, geography (or at least Anglo-American geography) took on a global perspective emphasising the commonality of human experience and a positivistic search for universal laws and theories to explain the spatial patterns that resulted. Wolforth drew a parallel between the decline in internationalism and the realisation of the inequalities that the global village concept had hidden and the new inward-looking emphasis on individual experiences of space and place in behavioural and humanistic geography. Another reaction to positivism in geography at this time led to what has become known as the "geography of concern". Even some humanistic geographers recognised the importance of a geography of concern in their work. For example, Daniels (1985) argues that the connotations of stability, propriety and belonging in the concept of place (which is so central to humanistic geography) makes it a very conservative concept, "one that can perhaps help us understand, even resist, destructive changes but one that (also) threatens to oppose change." And, as Buttimer (1981) argues, academic explorations of the sense of place experienced by the poor could, at times, amount to a tacit condoning of the conditions of poverty that define their place in the world and the unjust social processes that create and maintain them.

Concern-oriented geography has taken two distinct paths. One has become known as welfare geography and is a liberal response to social inequalities. Welfare geography seeks to describe patterns of inequality of life chances and understand the power relationships that create them in order to predict or plan better patterns of welfare (Bale, 1983). In many ways, welfare geography has probably been the major reform in geographical education in the last decade and it certainly has focussed some attention on the importance of geography in everyday life through its emphasis on mapping urban, regional and global inequalities, studying Third World development issues and solving local planning problems (see Westaway, 1980, Bale, 1981 and Greig, Pike and Selby, 1987 for teaching suggestions on approaches to welfare geography). The second strand is a much more radical one as it recognises that the welfare approach offers only ameliorative solutions to the problems of an unjust social order and ecological destruction (Wallace, 1975). As a result, welfare approaches in school geography are generally acceptable even to those who worry about the infusion of values into the curriculum because they do not challenge "the internal conflict-ridden dynamics of society, the causal relations between social contradictions ('problems') and social structure, or the significance of the state" in sustaining the status quo (Lee, 1983). The radical social and economic restructuring needed to redress the North : South and East : West divisions of the world that perpetuate social injustice posed by the advocates of this second approach (Johnston and Taylor, 1986) are much more problematic in educational terms. Despite this, radical geography has important implications for education for living, primarily because its goals include uncovering the social structures, such as capitalism, patriarchy and institutional racism, that disempower individuals from taking control of their lives. It is important to remember that social structures, whilst supported by very strong forces, are not fixed and that within these structures there is a role for human choice between alternatives and some encouragement to individuals and groups to challenge the structures and work to change them. This is the dialectic between social structure and human agency, a concept which Lee (1983) has described as being "of central importance to the future of human survival" and "the most fundamental idea to impart through education." He continued that this idea is educationally:

"...constructive, critical and and responsible and makes people aware of their potential to influence the course of their own destinies. It is, therefore, vital that teachers question at all times the very nature of society itself and the ideas it produces" (Lee, 1983).

2. Developments in education

Changes in educational thought since 1978 have supported the educational implementation of these developments in radical geography. In particular, they have challenged both the conservative view of the role of education which seeks to fit people to particular occupations and social levels and the liberal-progressive view which focuses on individual growth and development as the way to a better society. Both of these approaches to education overtly and covertly support the role of schooling as an agent for reproducing the social relations of our societies rather than preparing young people to play a role in choosing the sort of society in which they would like to live. (For a fuller development of this argument, see Apple, 1979, 1982).

Socially-critical approaches to education have been developed to help students work towards such ends, especially in challenging any injustice and irrationality they perceive in the way the world works at the moment. Kemmis (1983) describes the socially-critical approach to education as one which rejects narrow vocationalism and individualism and which replaces them with approaches that value individuals as members of a society. Kemmis sees the development of social competence or literacy in becoming an informed and involved member of society as a major educational goal. This has wide implications for the way schools and the curriculum are organised, for example:

"The members of society view values the individual as a member of society and so it institutes collaborative values. It sees the school as a community and within a wider community, so it concerns itself with issues about how communities come into being, how they work, and why they decay. It recognises that power comes not from the presumed right to dispose over other people's lives, nor from the confidence or competence of individuals, but from the democratic organisation and striving of groups towards justice and rationality. It involves kids and teachers in participatory decision-making; it involves the community in curriculum decision-making; it negotiates the conduct of teaching and learning, and it is committed to real experience-based, collaborative learning about socially-useful matters." (Kemmis, 1983)

3. Developments in geographical education

Huckle (1983, 1985) has combined the traditions of radical geography and socially-critical education to provide a critique of the predominance of conservative and liberal approaches to education in the design and teaching of geography curricula. In particular, he sees the following as all-too-common features of much geography teaching and evidence of the role of geography in schools as an agent for social reproduction rather than as an avenue of human liberation:

- Geography is seen as a body of unproblematic facts to be committed to memory.
- Success is defined largely by a student's ability to reproduce ideas, skills and attitudes that reproduce the status quo.
- There is an over-emphasis on description rather than explanation, and the explanations that are provided tend to be deterministic and ignore the role of social, economic and political processes, especially the role of capital and historical contexts.
- Students are thus given a depoliticised and dehumanised view of the world
- Problem-solving and decision-making skills focus on resolving the dilemmas posed by pluralistic values and emphasis a consensus view of society, ignoring the role of conflict and the use of power of various sorts in the resolution of such dilemnas.

In advocating a "geography for living" alternative to such approaches, Huckle (1985) advocates a critical and emancipatory geography which can help people deconstruct and transform their physical and social environments, emphasising "how societies are made and remade, and how landscapes and human-environment relations change in the process." With Donnelly (1980) and Fien (1984), he advocates teaching the skills of reflection and action to empower students for the tasks of transforming the realities of life that they confront, such as international conflict, human rights, racism, sexism, poverty, materialistic consumerism, unemployment, technological change and environmental deterioration. These, Huckle (1985) argues should be the focus of curriculum content (see Fien and Gerber, 1988).

Slater (1982) has argued that such an approach to geographical education involves reformulating what are commonly seen as the basics of education - literacy, numeracy and graphicacy. Literacy, for example, she argues needs to be seen in a much wider sense than just reading text. Literacy in the fullest geographic sense involves understanding a range of choices and preferences in order to "read, analyse, clarify and interpret one's own and other people's values, interests and points of view." Likewise, a wider view of graphicacy and numeracy would seek to "promote an ability to question, to read assumptions, to detect limitations expresses in words, numbers or diagrams, (and) to go beyond the information given." Such approaches develop the skills of political literacy so necessary if education is to empower students to take control of their lives and their environments rather then be passive agents for the status quo. Such a political education requires more than a knowledge of how society is run, how people and environments interact or how resources are distributed and used. It requires an introduction to citizenship, but not citizenship in the sense of civics and institutional politics, but rather as the study of issues and political interests, and the exploration of ways of exercising power and influence and developing criteria for making wise political choices (DES, 1977).

Skills for living

The Programme for Political Education in the United Kingdom (Porter 1984) has provided a workable model that geographical educators have used to promote important knowledge, skills and values for living through the development of political-literacy as outlined in Figure 18.2. McElroy (1988) has provided examples of the ways that geography may be used to promote such goals through the study of local issues, environmental conflicts, urban decision-making, equity issues and resource allocations. He has also described three case studies his students have undertaken in this area: seeking a resolution of the the impact of political boundaries on road and bridge maintenance in the local area, stopping the closure of roadside fruit and vegetable stalls, and the development of a local recreation plan. Huckle (1988) has provided a major case study of how to promote citizenship skills through the study of a national environmental issue and, through it, a model which all teachers may follow in the development of similar curriculum units for their students.

While the Programme for Political Education has been criticised for its focus on consensual decision-making and thus ignoring the real ways decisions are made in society (Gilbert, 1988) and for its separation of personal and public power (Williamson-Fien, 1987), it does provide a model way of promoting many important skills for living. Within the context of a broad definition of practical citizenship, Remy (nd) has listed such skills as:

1. Acquiring, analysing, evaluating and using information

2. Assessing one's involvement and stake in a situation, issue, decision or policy

3. Making informed and thoughtful decisions that balance self-interest and social responsibility

4. Using standards such as justice, ethics, morality and practicality to make judgements about people, events, issues, decisions and policies

5. Recognising one's interests in a situation, issue, decision or policy and developing effective strategies to promote one's interests.

6. Communicating one's ideas to others in a variety of effective forms to seek and influence change

7. Co-operating and working with others in groups and organisations to achieve mutual goals.

Such skills for living are essential elements of any geography curriculum if it is to play its role in empowering individuals to take control of their lives or, in Searle's (1975) terms, such an approach to education would not teach young people to "work and play records in chains, but to develop the ... (skills) to break through them." Yet, one must ask how well the papers in this section of this book address the breadth of such skills.

Case studies and applications

OVE BIILMANN outlines the contribution that geography can make to providing the knowledge and skill base for understanding phenomena, patterns and processes in the social and physical environment. He reports on the INFA (Information in School Subjects) Project in Denmark which is seeking to integrate geography with other subjects in order to expand the information base that students develop.

KELD LARSEN and TONNY HUBBE provide very interesting examples of the use of microcomputers in Denmark in helping students to organize and process the information that may be collected in the local area of their home and school. Computing skills are becoming increasingly important and can be of great benefit in helping young people to manage the range of information necessary for successfully addressing the geographical questions and problems demanded by their life roles. Computing skills may also be important for future career prospects.

ALAN JENKINS and DAVID PEPPER argue that employers in the Western world are increasingly demanding employees with transferable skills, especially the ability to learn new knowledge, work well with others on problem-solving tasks and communicate effectively in both written and oral presentations. They suggest geography teachers can help students develop these skills best by "paying more attention to the methods by which they teach" rather than by over-emphasising content. They describe two approaches they have used in the United Kingdom and offer advice to others who would adopt such innovations in higher education.

ROGER ROBINSON provides insights into the personal geographies of some English students. His paper reports that the students in his study hold quite unrealistic images of the lives and environments of people from South nations and that while they are willing to empathise, their empathy is so entwined with sympathy and paternalism that separating the strands is very difficult. Robinson remains concerned at the failure of the geography teaching experienced by his sample to develop realistic and empathetic images of the South.

A KNOWLEDGE

The politically literate person should have some understanding of:

1. The structure of power.
2. Customary ways of taking decisions and settling disputes.
3. Alternative ways and means of making decisions and settling disputes.
4. Where the resources (money, goods, time, space, etc.) come from and how they are allocated.
5. Alternative wyas of allocating resources.
6. The main political issues and disputes.
7. Who promotes what policies, goals or values and why.
8. The nature of political disputes and issues and their causes.
9. How these political disputes might affect oneself and the groups to which one belongs.
10. How these disputes affect other people and the groups to which they belong.
11. How to influence the decision-making process in given contexts including knowledge of alternative means of influence and their relative appropriateness for particular purposes.
12. Basic political concepts.
13. How to obtain information which one lacks.

B SKILLS

Political literacy includes the ability to:

1. Interpret and evaluate political information and evidence.
2. Organise information through basic political concepts and generalisations.
3. Apply reasoning skills to political problems and construct sound arguments based on evidence.
4. Perceive consequences of taking or not taking specific political actions in given contexts.
5. Express one's own interests, beliefs and viewpoints through an appropriate medium.
6. Participate in political discussion and debate.
7. Perceive and understand (if not agree with) the interests, beliefs and views of others.
8. Exercise empathy (to imagine what it might be like in someone else's shoes).
9. Participate in group decision-making.
10. Effectively influence and/or change political situation.

C VALUES

These are the kind of values to be encouraged through political education:

1. Willingness to adopt a critical stance towards political information.
2. Willingness to give reasons why one holds a view or acts in a certain way and to expect similar reasons from others.
3. Respect for evidence in forming and holding political opinions.
4. Willingness to be open to the possibility of changing ones own attitudes and values in the light of evidence.
5. To value fairness as a criterion for judging and making decisions.
6. To value the freedom to choose between political alternatives.
7. Toleration of a diversity of ideas, beliefs values and interests.

Figure 18.2 The knowledge, skills and values needed for political literacy

More attention to values education, which is so important in developing and refining students' personal geographies, is one way that the concerns expressed by Robinson can be addressed. While not in the area of intercultural understanding, the papers by YEE-WANG FUNG from Hong Kong and HARTWIG HAUBRICH from West Germany do explore the role of geography in values education. The first of these papers illustrates how teaching grid references and map signs can be used to promote an appreciation of the responsibilities of citizens while the second paper analyses role play and simulation as a means of developing important decision-making skills.

To this point, all the papers in this section are based on liberal ideology and a "banking" model of teaching geography (Treadaway, 1985). ROB GILBERT and FASHION PHIRI adopt a socially critical approach. Gilbert stresses the need for geography to promote the skills of critical analysis and reflection which can help students to identify the assumptions and social construction of much conventional knowledge and theory in both geography and society. Phiri extends this analysis and argues a case for geography to play a part in helping students to understand vital development issues in their own society and to make decisions congruent with a critical analysis of their own country's future.

Taken together, the collection of papers in this section indicate that the range of skills for living identified by Remy (nd) is being addressed by geographical educators around the world. However, this is not cause for complacency. Indeed, concern might be a more appropriate response because geographical education seems to be suffering from the same division of "adjectival" development as our parent discipline - physical geography, human geography, behavioural geography, humanistic geography, welfare geography and radical geography. The papers in this section are further divided by contrasting educational emphases, especially between liberal and socially critical ideologies. Thus, while they cover a wide range of skills for living, the sum of the parts does not equal the whole. Together, they do not provide a description of a satisfactory programme for developing the necessary skills for living through a study of geography. Perhaps, it is unfair to expect that they should. After all, the papers have been written by contributors from seven quite different countries representing quite different educational systems. Also, the authors have written on particular interests and individual skills for living. However, the question remains: Are there any programmes in geography that seek to provide comprehensive skills for living education? If there are not, what are the purposes of the many syllabusses in geography which are being taught all over the world?

REFERENCES

Adams, P. and Ward, C. (1982) *Art and the Built Environment*, London, Longman.

Althuser, L. (1971) *Lenin and Philosophy and other Essays*, London, New Left Books.

Apple, M. (1979) *Ideology and the Curriculum*, London, Routledge and Kegan Paul.

Apple, M. ed. (1982) *Cultual and Economic Reproduction in Education: Essays on Class, Ideology and the State*, London, Routledge and Kegan Paul.

AGTA (1988) "Geography in secondary education", *Geographical Education*, 5(4).

Bale, J. (1983) "Welfare geography", in J. Huckle, ed., *Geographical Education: Reflection and Action*, Oxford, Oxford University Press, 64-73..

Bartlett, V.L. (1984) "Look into my mind: Qualitative inquiry in teaching geography", in J. Fien, R. Gerber and P. Wilson, eds., *The Geography Teacher's Guide to the Classroom*, Melbourne, The Macmillan Company of Australia, 63-77.

Brown, G. (1971) *Human Teaching for Human Learning: An Introduction to Confluent Education*, New York, Viking Press.

Buttmer, A. (1981) "Home, reach and the sense of place", in A. Buttimer and D. Seamon, eds., *The Human Experience of Space and Place*, London, Croom Helm, 166-187.

Daniels, S. (1985) "Arguments for a humanistic geography", in R.J. Johnston, ed., *The Future of Geography*, London, Methuen, 143-158.

DES (1977) *Curriculum 11-16*, London, HMSO.

Donnelly, P. (1980) "Ways of learning geography as social education for youth, Years 9-12", in *Focus on the Teaching of Geography*, Proceedings of the 7th National Conference, Adelaide, AGTA, 25-58.

Downs, R. and Stea, D. (1977) *Maps in Minds: Reflections on Cognitive Mapping*, New York, Harper and Row.

Fien, J. (1979) "Towards a humanistic perspective in geographical education", *Geographical Education*, 3(3), 407-422.

Fien, J. (1983) "Humanistic geography", in J. Huckle, ed., *Geographical Education: Reflection and Action*, Oxford, Oxford University Press, 43-55.

Fien, J. (1984) "Teaching geography for change in world society", *Geographical Education*, 4(4), 185-201.

Fien, J. & Gerber, R. (1988) *Teaching Geography for a Better World*, 2nd Edition, Edinburgh, Oliver and Boyd.

Fink, L.D. (1977) *Listening to the Learner, University of Chicago*, Department of Geography, Research Paper, No. 184.

Gilbert, R. (1988) "Teaching for social and political literacy through geography", in J. Fien, R. Gerber and P. Wilson, eds., *The Geography Teacher's Guide to the Classroom*, 2nd ed., Melbourne, The Macmillan Company of Australia.

Gill, D. (1983) *Assessment in a Multicultural Society: Geography*, London, Campaign for Racial Equality.

Gregory, D. (1978) *Ideology, Science and Human Geography*, London, Hutchinson.

Greig, S., Pike, G. and Selby, D. (1987) *Earthrights: Education as if the Planet Really Mattered*, London, Kogan Page and World Wildlife Fund.

Hall, R. (1984) "Developing sensory awareness and aesthetic appreciation of the environment", J. Fien, R. Gerber and P. Wilson, eds., *The Geography Teacher's Guide to the Classroom*, Melbourne, The Macmillan Company of Australia, 44-62.

Huckle, J., ed. (1983) *Geographical Education: Reflection and Action*, Oxford, Oxford University Press.

Huckle, J. "Geography and schooling", in R.J. Johnston, ed., *The Future of Geography*, London, Methuen, 291-306.

Huckle, J. (1988) "The Daintree rainforest: Developing political literacy through an environmental issue", in J. Fien and R. Gerber, eds., *Teaching Geography for a Better World*, 2nd ed., Edinburgh, Oliver and Boyd.

Johnston, R.J. (1983) *Philosophy and Human Geography*, London, Edward Arnold.

Johnston, R.J. and Taylor, P., eds.(1986) *A World in Crisis? Geographical Perspectives*, Oxford, Basil Blackwell.

Kemmis, S. (1983) "Getting our thinking straight: Three views of education", *AdVISE*, No. 37, 1-3.

Lee, R, (1985) "Teaching geography: The dialectic of structure and agency", *Journal of Geography*, 82, 102-109.

McElroy, B. (1988) "Learning geography: A route to political literacy", in J. Fien and R. Gerber, eds., *Teaching Geography for a Better World*, 2nd ed., Edinburgh, Oliver and Boyd.

Merleau-Ponty, M. (1962) *The Phenomenology of Peception*, New York, Humanities Press.

Naish, M. (1980) "A medium for education", *Times Educational Supplement*, 18 April.

Pattison, W.D. (1970) "The educational purposes of geography", in D.G. Kurfman, ed., Evaluation in *Geographic Education*, Belmont, California, National Council for Geographic Education and Fearon Publishers, 17-26.

Porter, A. (1984) *Principles of Political Literacy: The Working Papers of the Programme for Political Literacy*, University of London Institute of Education.

Relph, E. (1976) *Place and Placelessness*, London, Pion.

Remy, R.C. (nd) *Handbook of Basic Citizenship Competencies*, Alexandria, Viginia, Association for Supervision and Curriculum Development.

Romey, W. and Elberty, W. (1980) "A person-centred approach to geography", *Journal of Geography in Higher Education*, 4(1), 61-71.

Seamon, D. (1980) *A Geography of the Lifeworld*, London, Croom Helm.

Searle, C. (1975) *Classrooms of Resistance*, London, Writers and Readers.

Sharp, R. (1982) *Knowledge, Ideology and the Politics of Schooling: Towards a Marxist Analysis of Schooling*, London, Routledge and Kegan Paul.

Slater, F. (1982) "Literacy, numeracy and graphicacy in geographical education", in Graves, N. et al., *Geography in Education Now, Bedford Way Papers*, No. 13, University of London Institute of Education.

Stoltman, J. (1980) *Mental Maps: Resources for Teaching and Learning, Teaching Geography Occasional Papers*, No. 32, Sheffield, Geographical Association.

Tuan, Yi-Fu (1974) *Topophilia: A Study of Environmental Perception, Attitudes and Values*, Englewood Cliffs, Prentice Hall Inc.

Wallace, I (1975) "Towards a humanised conception of economic geography", in D. Ley and M. Samuels, eds., *Humanistic Geography*, London, Croom Helm.

Westaway, J. (1980) "Measuring development", *Teaching Geography*, 5(4), 165-167.

Whitty, G. and Young, M., eds. (1976) *Explorations in the Politics of School Knowledge*, London, Nafferton.

Williamson-Fien, J. (1987) "Women, politics and political education", in Lewis, L. *Political Education in Australia*, SEAA Monograph, No.3.

Wolforth, J. (1976) "The new geography - and after?", *Geography*, 61 (3), 143-149.

19: THE DEVELOPMENT OF ENVIRONMENTAL LITERACY THROUGH GEOGRAPHY

Ove Biilmann

Environmental literacy may reflect skills and knowledge as well as various sorts of understanding. In an elementary sense it is a prerequisite of a normal daily life. We must be able to cope with practical problems in our environment such as finding our way or choosing a place in which to live. In a wider context environmental literacy is crucial to our well being, our quality of life and our perception and understanding of foreign peoples, places and countries.

The concept of environmental literacy and awareness has developed from a number of sources and is expressed or reflected in a variety of publications especially in the fields of behavioural and humanistic geography. However, in such publications, the concept of environmental literacy is more frequently implicit than explicit.

The contribution of behavioural and humanistic geography

Humanistic geographers pose questions about "a shared world view", "uniqueness of private milieux" and "the role of the individual past in apperception of the milieu" (Lowenthal 1961) on the agenda. They reason about the fact that "..within the spatial discipline of geography the concept of self-regulation of structures is widely applicable, from geomorphology to the behavioural complexes of 'political man', but it is of special relevance for those problem-producing situations that involve the study of decision-making". (Kirk, 1978)

Under "environmentalism" (the geographer) seeks meaning in order - finds a largely, timeless and tidy world; under "existentialism" he or she seeks meaning in the landscape, as in literature, because it is a repository of human striving (Tuan, 1971: 184). David Harvey (1984) stresses that the history of geography is a part of the history of society.

Kevin Lynch's *The Image of the City* presents a conceptual structure for environmental imagery which is useful for didactic and practical educational purposes. It focuses on the concepts of paths, edges, districts, nodes and landmarks as well as for the general concept of (environmental) legibility which in a sense precedes environmental literacy (Lynch, 1960). He details themes such as "formation of the image", "reference systems", "element interrelations", "the sense of the whole" and "structure and identity".

The questions raised by Lynch are dealt with in the psychological-geographical literature concerned with images. Research in this field adds important aspects of relevance to environmental literacy and local studies. Blaut and Stea (1973) and Lloyd (1982) have summarized the gains and perspectives on imagery, cognitive mapping and spatial learning, while Kaplan and Kaplan (1982) have overviewed the field of behaviour in cognition of and communication on the environment.

The didactic perspective

These themes and concerns illuminated through humanistic and behavioural geography are repeated and considered in various didactical discussions and studies (Gregory, 1985). Such studies are mainly analytical or normative rather than empirical (Hard et al., 1984), and this reservation also applies in the present paper.

This paper deals with didactic procedures, frames or principles rather than with specific exercises and activities designed for pupils. It is an attempt to minimise the gaps between general pedagogic goals, pupil's learning experiences and teachers' day to day work as it is conducted through lesson planning and practical teaching. The references to, and descriptions of, environmental exercises attempt to highlight central didactic matters. Only two topics - the local built landscape and local weather observations - are considered from the standpoint of practical, classroom or field work purposes.

Observations and experiences carried out in the local environment provide frames of reference and often motivating starting points for studies of foreign places, regions and people - and vice versa. The dialectic interaction between the near and well known and the remote and unknown is a basic prerequisite for the development of environmental literacy and more general geographior world literacy.

The claim that environmental literacy is important for personality development and for international understanding is supported in theory by Hard et al. (1984) and by research evidence (Biilmann, 1980; 1986b;Kaplan & Kaplan, 1982). Evidence from both sources explains why local and environmental studies have played an important part in the teaching of geography and why environmental studies have been the focus of so much consideration by the educational community.

Danish and cross-national studies as case studies of some aspects of environmental literacy

The INFA-project (Informatik i Skolens Fag = Informatics in the school subjects) is an educational research and development project which assesses the use of educational technology and informatics in geography, biology, science, social studies and language learning. Danish folkeskoler (primary and lower secondary schools), teacher training colleges, departments at the Royal Danish School of Educational Studies, public agencies and high technology companies contribute to its efforts. The INFA activities mentioned in this paper are organized as joint integrated studies - geography - science - foreign language educational research and developmental efforts for pupils aged 12-17 years.

As part of the research carried out by the INFA-project, students are given a comprehensive questionnaire about their local environment. It reflects a "traditional" Kevin Lynch approach, some well known behavioural geographical perspectives (e.g. on attitudes) and an attempt to capture wider regional perspectives (see Figure 19.1)

The results of this questionnaire may be used by geography teachers as follows:

1. To motivate local environmental learning activities based on and mediating a scientifically sound content.

2. To develop learning experiences that emphasize different scales of study ranging from local to national and international. The results also enable teachers to consider the contrast between pupils' direct experience (Perception - apperception) of the environment and their indirect experience of foreign regions through various media.

3. As a device for studying pupil's attitudes and knowledge for the teachers' own evaluations of their syllabuses.

Such questionnaire-based exercises have already been used extensively and the first and the third functions have been found to be most valuable. They are easily applicable in most societies and may provide much valuable information on pupils' levels of environmental literacy and much support for teachers' own evaluative efforts.

On the other hand, much still needs to be done especially in areas such as pupils' concept of scale and our understanding of how they see the near/known/familiar when compared with the distant/unknown/unfamiliar. Such studies may help us to develop environmental literacy into a world literacy - to make the world legible and widen pupils' world image and understanding.

The preliminary experiences and studies together with previous findings reveal various important didactic aspects of environmental literacy. This is expressed and confirmed through some Danish teachers' experiences. The INFA-project attempts to investigate these phenomena thoroughly through successive analyses, questionnaire studies and classroom observations.

Examples: On educational aims, topics and practice.

Pupils observe, describe and assess natural and human environment emphazising meteorology and air pollution at both local and larger scales. Observations and assessments are carried out three or four times a year. Observations and assessments are analyzed and compared with relevant sources - weather reports, satellite photos, graphs and local environmental observations.

The introductory topic to local environmental studies is often local meteorology (including a study of basic climatology), air pollution and environmental changes, risks and damages, highlighting weather and local environmental observations.

Weather and air pollution observations motivate and legitimate various broader studies and field work aimed at changing environments in local, regional and global scales. The work includes:

a) observation, analysis and assessment of a variety of local environmental factors;
b) comprehensive documentation of environmental damage, the struggle against air, water pollution and the restoration of ruined environments;
c) observation and documentation of phenomena important to living conditions, social welfare and life style such as the demographic, ethnic, social and economic composition of populations, neighbourhoods and regions;
d) co-operative description, comparison and evaluation of different environments and living conditions.

These highlight later topics such as studies of global population which emphasise demographic, economic and social aspects of local living conditions. Overviews of planning and content organization are elicited mainly by questionnaire studies.

Questionnaires are filled in by teachers as well as by pupils. The teachers' questionnaire asks teachers to indicate the educational sequences of their syllabus and to describe its content. They are also asked to state the reasons for content location (in terms of practical possibilities, consideration of continuity, progression, integration and pupils knowledge). This is achieved by requiring teachers to:

Part 1

1 Draw a sketch map of your (a) school area ....

(b) area of residence ....

(c) area of ....

2 State your school, residence or .... on the sketch map and compare with the map of the area.

3 State the most important landmarks (mark with a cross), paths (blue line), nodes (circle), edges (red line) and districts (hachures in different colours and directions).

In built up surroundings the following is particularly remarkable:

Landmarks (point references), which are conspicuous and may be used for further orientation, locating of streets or describing of places and paths for other people. (Hospital in Herlev, Church of Grundtvig at Bispebjerg, town hall in Copenhagen and .... are examples of landmarks.

Paths or routes are used when you or other people are on the way to or from one place or another. (Streets or paths — for example: .... are paths which are used by pedestrians or cyclists. Railways, motoways, canals or rivers, for example: .... are paths which are used for transportation.

Nodes are junctions or places where several paths are crossing. Here are often lots of people and activity. (Central Station or Grabrodre Torv in Copenhagen, station square in Lyngby and ....) are examples of nodes.

Edges are lines sometimes borders separating different regions or areas. Regions are often bordered by edges. (The canal around the Slotsholmen, the railway cutting and the broad streets in Copenhagen are edges. The same concerns the separation between living-quarters, industrial areas, the green belts etc., for example:

....

Districts are regions or areas, which are conceived as totalities. They deviate from the surrounding areas. One often talks about inside and outside of districts. (A living-quarter, a park, a large factory, a sports centre, green belts etc., for example: ....).

In our surroundings we find all these phenomena together. A motorway or a railway could be an important path, which separates two districts like and edge. The interchange of the motorways and the railway stations are often a node. The Statue of Liberty in Copenhagen stands as a landmark in the centre of paths which are crossing each other in a node. A shopping centre is often both landmark, node and district.

School: .... Class: ....

Teacher: .... Date: .... Time: ....

Figure 19.1 Questionnaires used to investigate pupil perceptions of their local environment

Part 2

1 State the districts or regions you prefer and those you dislike on the map of your local community (a-b) or
.... (c).

2 State the reasons why you prefer or dislike the particular districts.

district:
like because: ....

dislike because: ....

like because: ....

dislike because: ....

School: .... Class: ....

Teacher: .... Date: .... Time: ....

Part 3

1 Which district or city in Denmark would you prefer to live in if you were forced to move from the Copenhagen area?
....

2 Which European city or state would you prefer to move to if you were forced to move from Denmark?
....

3 Which city or state outside Europe would you prefer to move to if you were forced to move from Europe?
....

4 Why would you prefer the Danish city you stated in answer No. 1?
....

5 Why would you prefer the European city or state you stated in answer No. 2?
....

6 Why would you prefer the city or state you stated in answer No. 3?
....

School: .... Class: ....

Teacher: .... Date: .... Time: ....

Figure 19.1 (Continued) Questionnaires used to investigate pupil perceptions of their local environment

1) select appropriate descriptions of their syllabus from a number of possibilities,
2) answer a number of precise questions, and
3) give comments on themes such as:
    - chosen and executed activities (educational events/special subjects)
    - educational content: headline/indication, important viewpoints/ perspectives, basic concept, procedures etc.
    - chosen and used aids: software, map, atlas, text, OHP, slides, measuring equipment etc.
    - chosen and executed educational method/"style"
    - teacher's background.

In certain cases more detailed information is requested about experiences, evaluations and reasons for choosing particular content, methods or materials.

In addition, questionnaires and pupil activities are used with a view to measuring educational results or to give a better understanding of pupil's knowledge, ability and attitudes. In a few cases classroom observations may be carried out.

Such questionnaires work as a planning device and are completed for every participating school class. They ensure that basic observational sequences and data analyses are carried out simultaneously. The completed forms reflect different approaches to education on climatological and environmental topics. Similar forms are used when work on social, political and economic geographical aspects of local society and living conditions are planned and reported.

Syllabus development based on the INFA-project model ensures that pupils experience:

a) Foreign language education as cultural mediation.
b) Weather observation.
c) A study of changing weather patterns and levels of pollution in a variety of different places.
d) An analysis of the effects of environmental damage on local living conditions.
e) The opportunity to evaluate their local environment.

Conclusion

The Danish experience supports the view that geographical education should emphasize a wide range of exercises, observations field studies aimed at improving environmental literacy.

It is proposed that pupils' experiences and observations should be analyzed and stored in computers. A data network should be developed to facilitate data presentation, data exchange and comparisons between school classes doing social studies in different areas or countries, as well as interacting with various public domain databases.

The facility provided by computers for pupils to compare and contrast their own local environmental studies with those of other schools in other areas, and with their studies of foreign regions will make a major contribution to environmental literacy and this environmental literacy is an integral part of their world literacy.

This connection between local environmental studies and world literacy is crucial to curricular consideration, lesson planning and teaching practice in both regionally organized geography education and various sorts of local studies, irrespective of whether they are integrated with other disciplines or not. Furthermore, co-operation between school classes and geographical regions promotes mutual understanding.

When environmental literacy and world literacy are approached through practical, interpretative, experiences based on pupils' own evaluation of both local and distant environments, then not only are they engaging in activities comparable with more advanced research, but their studies are contributing to our quality of life and our perceptions and understanding of foreign peoples, places and countries.

REFERENCES

Biilmann, O. (1980) "Regionale Geographie - Eine fachdidaktische Skizze", In Brinkmann, W. & Reinhardt, K.H. eds., *Praxis und Theorie der Geographiedidaktik in Danemark, Deutschland und Schottland*, Hamburg, Fachbereich Erziehungswissenschaft der Universitat Hamburg, 42-61.

Biilmann, O. (1986a) "Danish Pupils' Knowledge of the Geography of European Countries", *Internationaler Schulbuchforschung*, 8(2), 195-213.

Biilmann, O. (1986b) "Europas Geografi - bidrag til en skitse af danske skoleelevers omverdensbillede", *Kulturgeografiske Skrifter bd,* 12(1), Kobenhavn, C.A. Reitzel.

Biilmann, O. (ed.) (1986) *Tabelbilag til Kulturgeografiske Skrifter*, 12(1-2), Skrifter fra Geografisk Institut, Kobenhavn, Danmarks Laererhojskole.

Biilmann, O. & Tonny Hubbe (1987) "Udviklingsarbejde i Geografi", *Kultugeografiske Skrifter bd.* 12(2), Kobenhavn, C.A. Reitzel.

Boardman, D. (1983), *Graphicacy and Geography Teaching*, London, Croom Helm.

Brauer, S., Folke L. og Schmidt J. (1983-86) "Geografiundervisning i 6.-7. klasse - et paedagogisk udviklingsarbejde", *Rapport* No. 1-4, Kobenhavn, Folkeskolens Forsogsrad/Gentofte Kommunale Skolevaesen.

Gregory, D. (1985) "People, places and practices: the future of human geography", In King, R. (ed.) *Geographical Futures*, Sheffield, The Geographical Association, 56-76.

Hard, G., Jessen, F. & Schirge, M. (1984) "Umweltwahrnehmung in der Stadt", in Kock, H. (ed.) *Studien zum Erkenntnisprozess* im Geographieunterricht, Koln, Aulis Verlag, 113-165.

Harvey, D. (1984 "On the history and present condition of geography: An historical materialist manifesto", *The Professional Geographer*, 36(1), 1-11.

Kaplan, S. & Kaplan, R. (1982) *Cognition and Environment*, New York, Praeger.

Kirk, W. (1978) "The road from Mandalay: towards a geographicalphilosophy", *Transactions Institute of British Geographers*, New Series 3 (4), 381-394.

Kock, H. (1984) "Schuler und geographische Begriffe. Versucheiner empirischen Erfassung der Verhaltnisses von Schuler und begrifflicher Komplexitat/Abstraktheit", in Kock, H. (ed.), *Studien zum Erkenntnisprozess im Geographienterricht*, Koln, Aulis Verlag, 166-237.

Lloyd, R. (1982) "A Look at Images", *Annals, A.A.G.*, 72 (4),532-548.

Lowenthal, D. (1961) "Geography, experience and imagination: towards a geographical epistomology", *Annals, A.A.G.*, 51, 241-260.

Lynch, K. (1960) *The Image of the City*, Cambridge, Mass., M.I.T. Press.

Stea, D. & Blaut, J.M. (1972) "Towards a developmental theory of spatial learning", in Downs, R.M. & Stea, D. (eds.) *Image and Environment*, Chicago, Aldine, 51-62.

Tuan Yi-Fu (1971) "Geography, phenomenology and the study of Human nature", *Canadian Geographer*, 15(3), 181-192.

20: THE USE OF COMPUTERS IN LOCAL ENVIRONMENTAL STUDIES IN THE LOWER SECONDARY SCHOOL

Keld Larsen

Local studies occupy a central place in several school-subjects in Danish primary and lower secondary schools. The study of the local environment, including topics such as living conditions, local weather, landscape and population provides pupils with knowledge and understanding of their own local environment. In a broader context, it helps pupils to create a frame of reference which furthers their understanding of foreign societies and thus widens their world image and understanding.

The relevance and didactics of local environmental studies are discussed in Ove Bülmann's contribution in the previous chapter.

The use of computers in geography classrooms may have a motivational effect on the pupils. Reasons for this may include the ease with which a computer can store, handle and present geographical data and offer support for model building and simulation. In pre-computer days a lot of time was used in manual data handling and representation. Frequently, no time was left for analysis. The use of computers releases time for more fruitful activities such as work with handbooks and maps or for fieldwork, where the pupils make observations in their local environment, collect data and make measurements.

This paper begins with a consideration of both application programs - spreadsheets and archive programs (administrative database programs) - and drawing applications in normal classroom practice related to the teaching in local studies. It then considers newly developed hardware and software which facilitate automatic measurement on a computer-operated weather station, as well as storage, analyses and presentation of the meteorological data. Finally, the possibilities for making simple digital image processing from satellite photos (METEOSAT and NOAH) on a personal computer, for example an IBM PC with either a colour display or a monochrome screen, are briefly described.

Spreadsheets used in local studies

An electronic spreadsheet is applicable to many teaching situations. The teacher can use it to build geographical models, training programs, simple simulations and databases. The pupils can use programs made by the teacher, as a tool to build their own models, solve problems, organize and present data collected from books and statistical publications or from observations and field measurements.

Pupils can easily learn how to operate spreadsheets. Only a minimum of knowledge of the function of the computer is required. After a few hours of instructions, pupils are able to solve simple problems using the spreadsheet. Classroom observations have shown that the pupils soon begin to make their own models or modify those made by the teacher. While doing that they ask questions such as: What happens if ......?

The following applications show examples of how spreadsheets are used in local studies in the frame of the INFA-project described in the previous chapter.

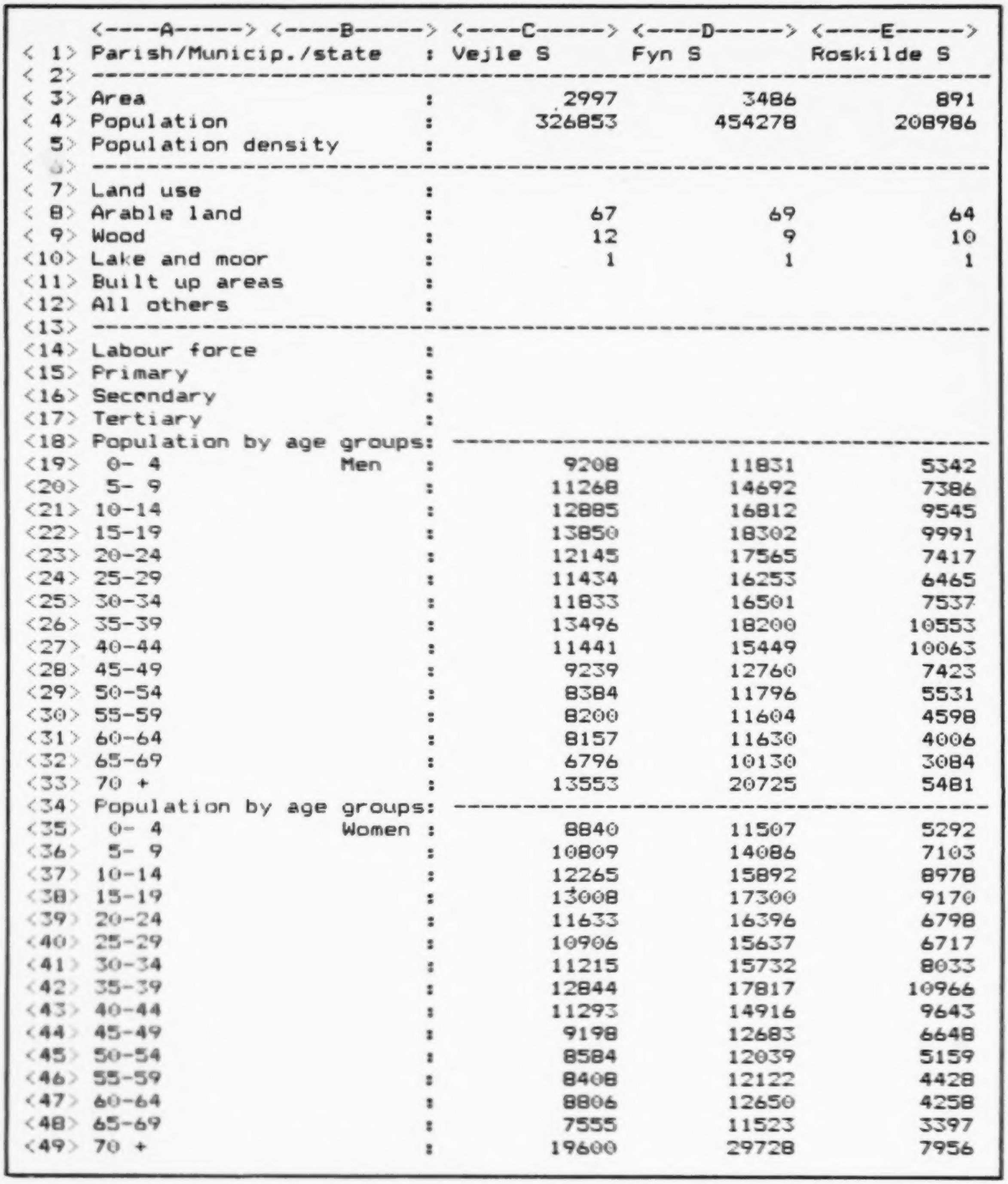
1. Statistical databases in spreadsheets

Statistical information about local communities of different sizes including administrative regions such as parishes, municipalities and countries are stored, represented and manipulated in a spreadsheet. The databases are made in LK-regn (LK-calc), a small menu-driven spreadsheet developed by The Royal Danish School of Educational Studies, for use in the lower secondary school of pupils from 12-17 years of age. The database contains statistical information about various regions which can be used as case studies and for comparisons in a local study context.

Pupils collect data from their own local community and record their information in the database. It enables them to compare their own data with matching information from other regions. The screen dump in Figure 20.1 shows some of the data stored in LK-regn. Similar data bases can be written in the SuperCalc3 educational version. It is a cheap, but advanced, spreadsheet with a lot of facilities such as a graphics module which makes it possible to produce different types of graph. This spreadsheet is used by pupils from approximately 14 years of age. The diagram shown in Figure 20.2 was created using SuperCalc3.

Educational/Tutorial advantages of using spreadsheets can be summarised as follows:

1. Quantitative data can be set out clearly and diagrams can easily be produced.
2. The pupils get a quick response when they test theories or modify parameters in models.
3. The pupils can complete a large number of training exercises in a short time.
4. Experiments confirm that the use of spreadsheets increases the speed of learning.



```
     <----A-----> <----B-----> <----C-----> <----D-----> <----E----->
< 1> Parish/Municip./state   : Vejle S      Fyn S        Roskilde S
< 2> ----------------------------------------------------------------
< 3> Area                    :         2997         3486          891
< 4> Population              :       326853       454278       208986
< 5> Population density      :
< 6> ----------------------------------------------------------------
< 7> Land use                :
< 8> Arable land             :           67           69           64
< 9> Wood                    :           12            9           10
<10> Lake and moor           :            1            1            1
<11> Built up areas          :
<12> All others              :
<13> ----------------------------------------------------------------
<14> Labour force            :
<15> Primary                 :
<16> Secondary               :
<17> Tertiary                :
<18> Population by age groups: --------------------------------------
<19>  0- 4              Men  :         9208        11831         5342
<20>  5- 9                   :        11268        14692         7386
<21> 10-14                   :        12885        16812         9545
<22> 15-19                   :        13850        18302         9991
<23> 20-24                   :        12145        17565         7417
<24> 25-29                   :        11434        16253         6465
<25> 30-34                   :        11833        16501         7537
<26> 35-39                   :        13496        18200        10553
<27> 40-44                   :        11441        15449        10063
<28> 45-49                   :         9239        12760         7423
<29> 50-54                   :         8384        11796         5531
<30> 55-59                   :         8200        11604         4598
<31> 60-64                   :         8157        11630         4006
<32> 65-69                   :         6796        10130         3084
<33> 70 +                    :        13553        20725         5481
<34> Population by age groups: --------------------------------------
<35>  0- 4              Women:         8840        11507         5292
<36>  5- 9                   :        10809        14086         7103
<37> 10-14                   :        12265        15892         8978
<38> 15-19                   :        13008        17300         9170
<39> 20-24                   :        11633        16396         6798
<40> 25-29                   :        10906        15637         6717
<41> 30-34                   :        11215        15732         8033
<42> 35-39                   :        12844        17817        10966
<43> 40-44                   :        11293        14916         9643
<44> 45-49                   :         9198        12683         6648
<45> 50-54                   :         8584        12039         5159
<46> 55-59                   :         8408        12122         4428
<47> 60-64                   :         8806        12650         4258
<48> 65-69                   :         7555        11523         3397
<49> 70 +                    :        19600        29728         7956
```

Figure 20.1 Population data stored in a spreadsheet

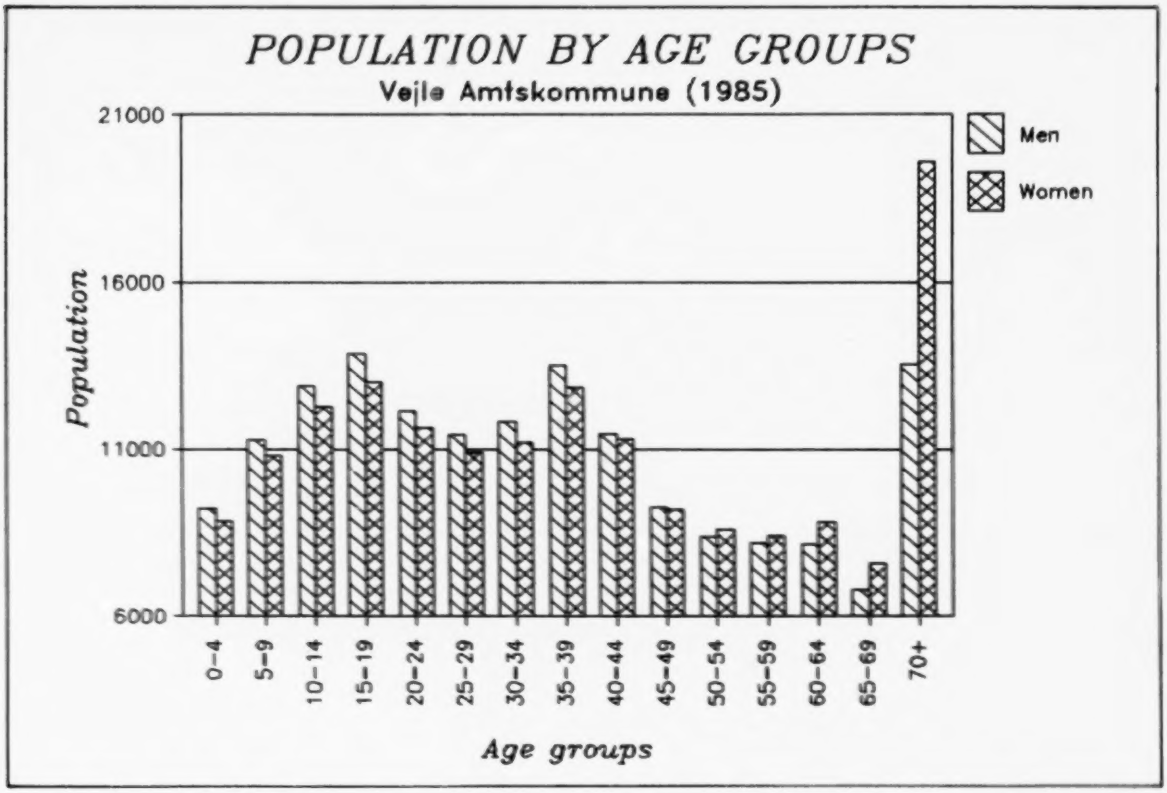


Figure 20.2 A bar chart created from a spreadsheet

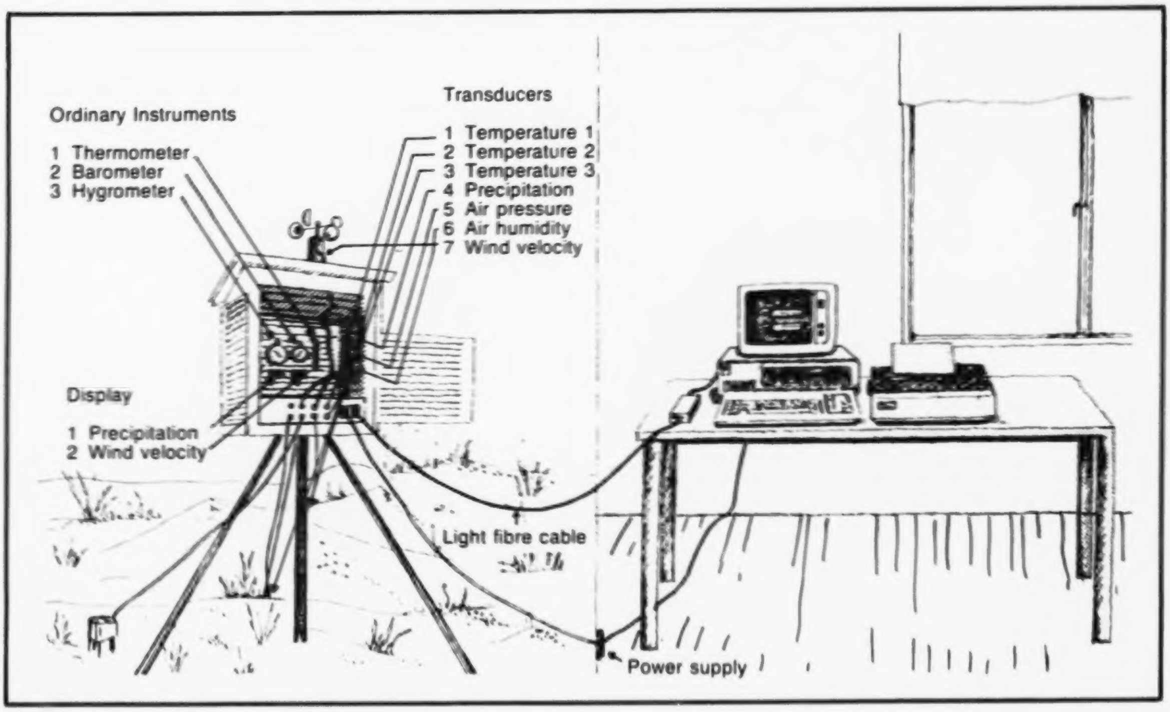


Figure 20.3 A computer operated weather station

5. It is easy to find and compare data from different local communities.

The quantitative data on the local communities described in LK-regn supplement the qualitative descriptions of the local communities stores in LK-arkiv (LK-archive is a database program matching LK-regn). Local studies and local descriptions are further discussed in the next chapter by Tonny Hubbe (Chapter 21).

2. A computer operated weather station

In the frame of the INFA-project a prototype of a computer-operated weather station has been developed in cooperation between the Geography and the Physics Institutes of The Royal Danish School of Educational Studies. Only a few prototypes of the station have been produced and one station is located at each of the schools which are cooperating with the INFA project.

The goal is to facilitate pupils' study of local weather over longer periods of time and to support series of observations comparable among the various schools as well as with the daily weather reports and maps from The Danish Meteorological Institute.

The Hardware.

The station is constructed like an ordinary weather observation station - a standard US Weather bureau shelter equipped with standard manual instruments such as a thermometer, an aneroid barometer and a hygrometer placed in the upper part of the shelter. On the roof a four cup anemometer is placed. The actual wind velocity can be read from a display located in the shelter. On the ground beside the station an electronic rain gauge and a display are located in the shelter. The manual instruments have two purposes:

a) Preliminary manual measurements and weather observations can be carried out by using the instruments outside the classroom by primary school pupils.
b) The instruments are used for calibration of the software operating the electronic weather station.

The box under the floor of the shelter contains the electronics operating the automatic part of the station. The electronic weather station has three temperature transducers, two of which are located outside the shelter. A pressure transducer and a humidity transducer are located

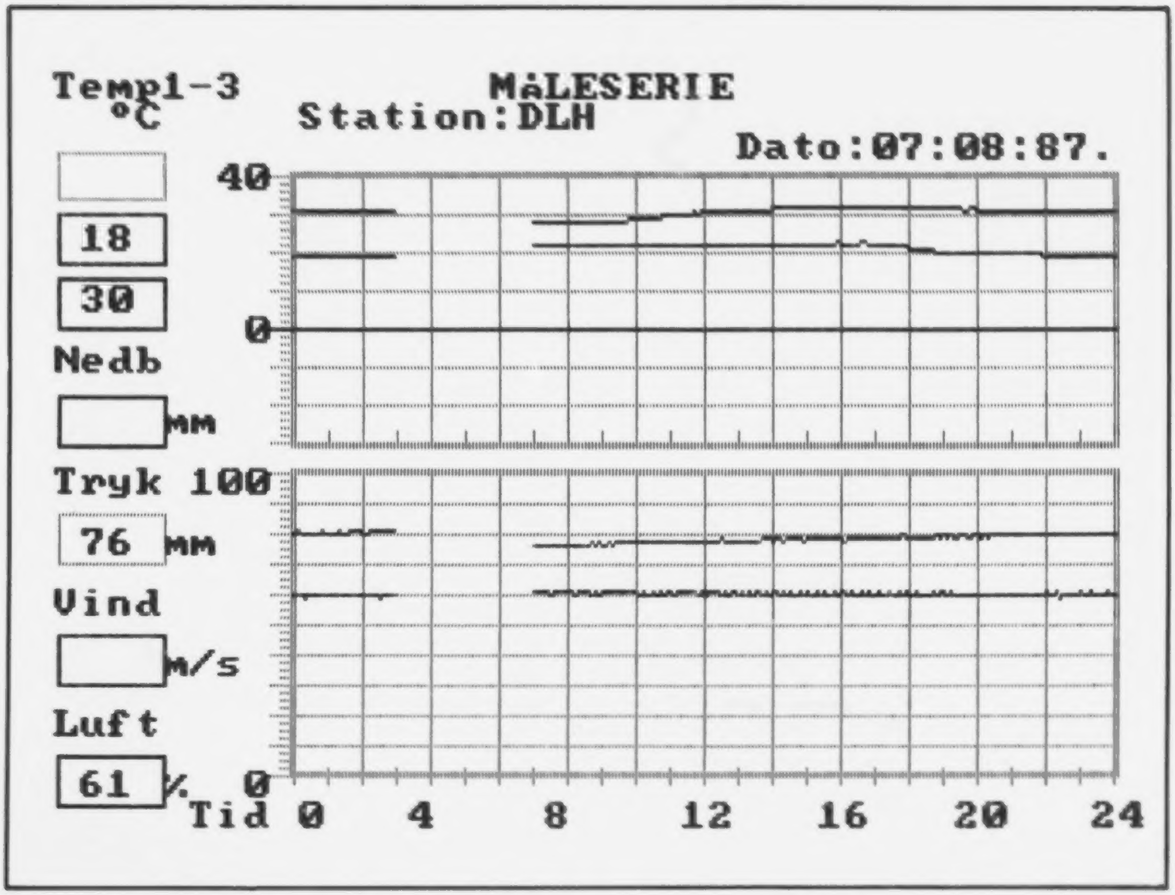


Figure 20.4 Weather data plotted from data collected from the computer operated weather station

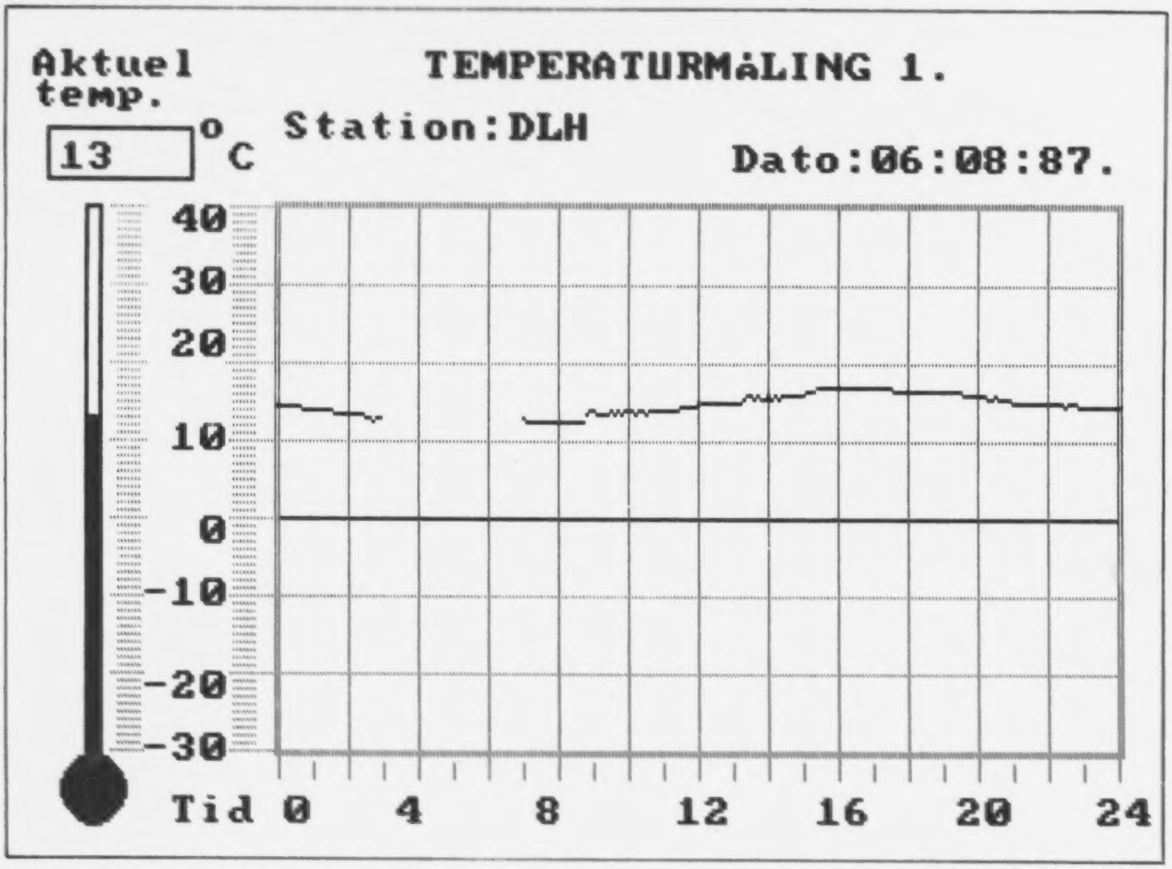


Figure 20.5 A temperature graph for a 24 hour period extracted from the data base

in the upper part of the shelter. Both the rain gauge and the four cup anemometer are connected to the operation box. Signals from the transducer are converted and transmitted to the computer via a light fibre cable. The construction of the station is shown in the drawing in Figure 20.3.

The Software

The software under development (a prototype was finished July 1987) and the weather station enable the pupils to set up measurement series. As mentioned above, seven weather parameters can be measured. Although the weather station is precalibrated the user may make minor corrections through the software. The program provides the pupils with the possibility of deciding the parameters. They only need to complete a measure menu on the screen. Measurements can be carried out over a period of time ranging from 1 to 24 hours and measurements of the chosen channels are automatically carried out every 10 seconds. All measurements of the chosen parameters are plotted in a diagram as shown in the dump in Figure 20.4.

All measurements can be saved on a data diskette and reproduced as a table on the screen or as hard copy. Each parameter may be shown individually in a specially designed display. Figure 20.5 shows the display in which temperature measurements can be plotted.

We aim at further software development providing the options of saving data as LK-regn or as SuperCalc3 files. It will then be possible to load the data into one of the spreadsheets where further statistical calculations and graphic portrayal can be performed. This will enable a database of local weather observations to be developed (See Figure 20.6).

3. Satellite photos

A prototype program module facilitating the presentation of satellite photos on a standard personal computer display has been developed. It is possible to perform simple digital image processing of data derived from the satellites such as METEOSAT and NOAH. The images are received in digital form (as data-bases in ASCII format) on a diskette from The Danish Meteorological Institute, but it is planned to have them transmitted via the datalogical network.

METEOSAT and NOAH images can be used in normal classroom practice to study the local weather in a broader context. In the Danish situation this is in relation to the Northern Hemisphere. Weather Radar reports provide

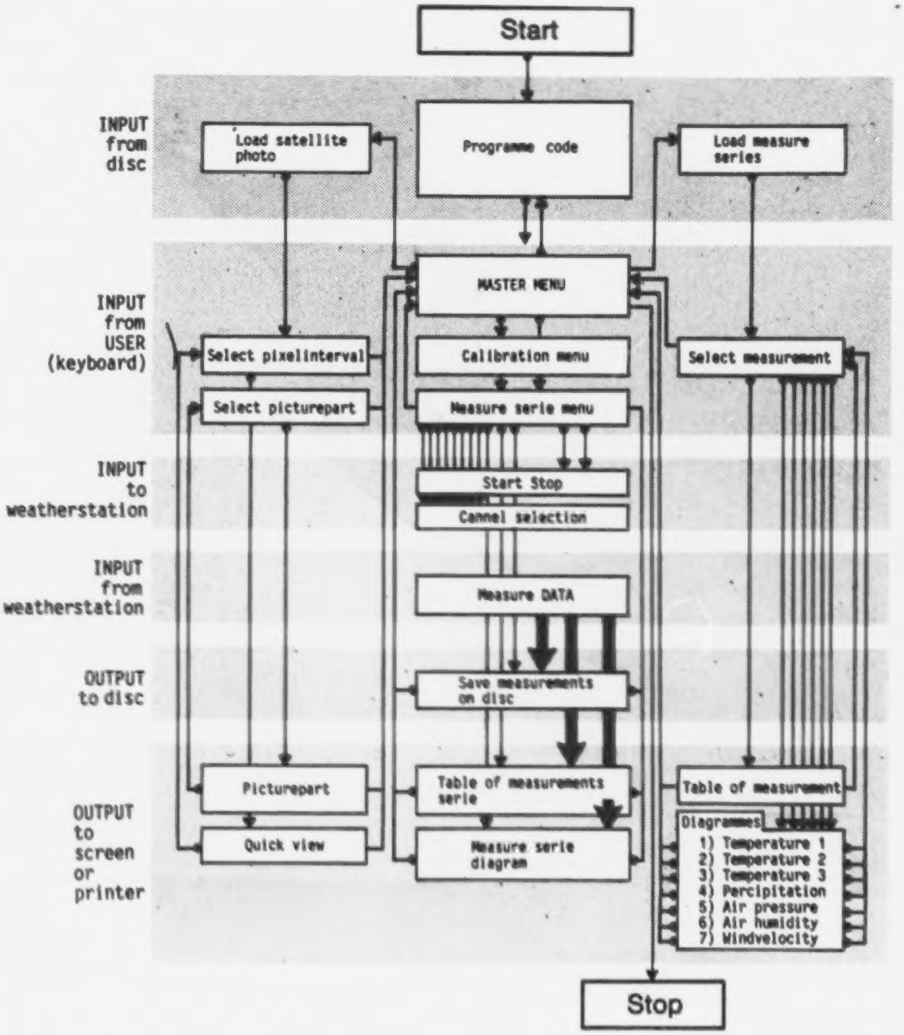


Figure 20.6 A flow diagram to show the processes of handling data from the automatic weather station and other sources

additional local information of the distribution and amount of precipitation. Together they provide information of the actual weather situation and can support pupils as they try to make their own weather forecasts.

Later, LANDSAT images in digital form will be used to provide more detailed information of local areas such as vegetation cover and land use. Satellite images stored in a digital form provide a variety of information, e.g. cloud cover and areas with different temperatures can be highlighted on the screen.

They can be loaded into a drawing application e.g. PC-paint - and different map information can be written and drawn on the photos. It is also possible to load series of METEOSAT pictures in PC Story Board which facilitates animation and description of typical weather situations.

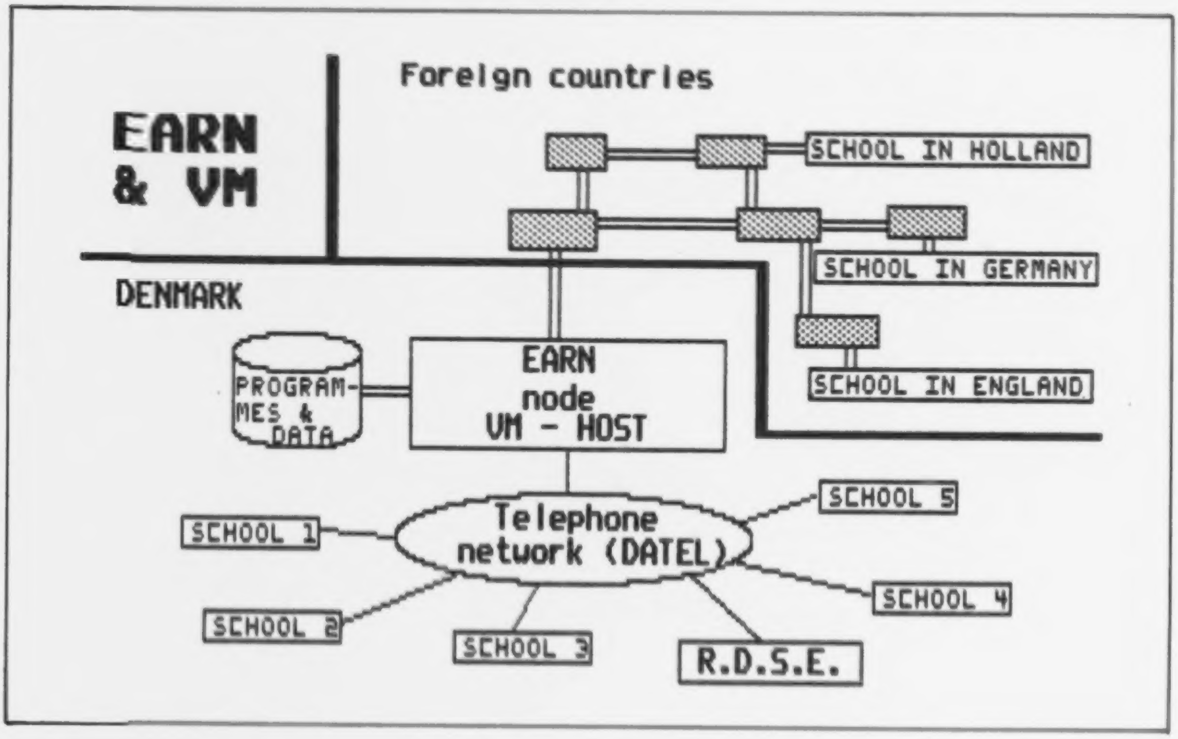


Figure 20.7 The potential links between students working in Denmark and other European countries

A datalogical network

Six lower secondary schools participating in the INFA project each have a local area network of eight IBM - PCs. From the autumn of 1987 these schools and the previously-mentioned institutions will be able to communicate both nationally via the Datel network (the Danish telephone network) and internationally via the EARN-network (European Academic and Research Network). The first pedagogical experiments will involve the communication and interchange of information about local weather and environmental conditions among schools at home and abroad. The above-mentioned programs will facilitate creation of data files to be communicated. Figure 20.7 shows the way in which schools in Denmark may be linked to schools in other European countries.

This educational development is an attempt to widen and develop the use, scope and interplay of various geographical media in an attempt to further the applicability of informatics and educational technology in geography classroom practices. It also aims at representations of and education in important phenomena and topics, which often cause difficulties to practical teaching, including coherent regional analyses and description. These efforts aim at better motivation and balance between local studies and studies of foreign regions and global problems.

REFERENCES

Arganbright, D. (1985) *Mathematical Applications of Electronic Spreadsheets*, McGraw-Hill, New York.

Larsen, K.J. (1987) *Regneark i undervisningen - en handbog*, Aschehough, Kobenhavn.

Larsen, K.J. (1986) Regneark i geografi - och samtidsorienteringsundervisningen, *Geografiska Notiser*, 19(3).

Stark, G. (1986) The Computer takes a Field Trip, *Computer Education*, November.

Dyrli, O.E. (1986) Electronic Spreadsheets in the Curriculum, *Computers in the Schools*, 3(1).

Olds, H.F. Jr. (1986) Information Management: A New Tool for a New Curriculum, *Computers in the Schools*, 3(1).

21: LOCAL STUDIES AND THE USE OF GENERAL APPLICATIONAL PROGRAMS IN ORDINARY CLASSROOM GEOGRAPHY

Tonny Hubbe

Local studies have been an integral part of the education in geography and in social studies for many years. The emphasis on local studies is justified on two main grounds:

1. It is essential that pupils are aware of their own society and all of its aspects if they are to become responsible and well- informed citizens.
2. Knowledge and insight into one's own society is not only a suitable, but also a necessary, frame of reference for the study of foreign countries and societies.
3. The study of the local society and the local environment - unless it is confined to egocentrism - offers scope for generalizations which make it possible for pupils to learn to:
    a) Draw general conclusions.
    b) Compare models with reality.
    c) Make comparative studies with other local environments.

Comparisons and generalizations on local environmental studies have often been carried out using superficial and outdated data. It is difficult for schools to get access to detailed and current statistics. The present form of presenting statistical information has often necessitated time-wasting calculations which at worst have meant that pupils never reached the point of solving the problem, discussed how to solve the problem or getting even an insight into the nature of the problem. In my opinion, it is possible to solve some of these problems by using application programs to support more conventional educational tools.

As a result of these problems and because we have the impression that the change-over to the information society should not be made by chance, members of the Geographical Institute at the Royal Danish School of Educational Studies (the DLH), have entered into a co-operative research and development project (the INFA project) with other research institutes and private firms.

The practical part of this project has so far included:

1. Development of applicational programs on several important themes within geography and social studies.
2. Arrangement of courses and meetings for teachers.
3. Elaboration of proposals to the implementation of teaching units using applicational programs and to which different forms of support are given by staff from the Geography Institute. The teachers in the project are planning to make evaluative reports about the units after they have implemented them in geography lessons.

In the remainder of this paper I will first describe an applicational program (an administrative database program using archive sheets) and its possibilities in local studies. Then, I will outline the educational course which starts at the project schools in September 1987. Finally, future development of the project will be described.

Introduction to the administrative database program

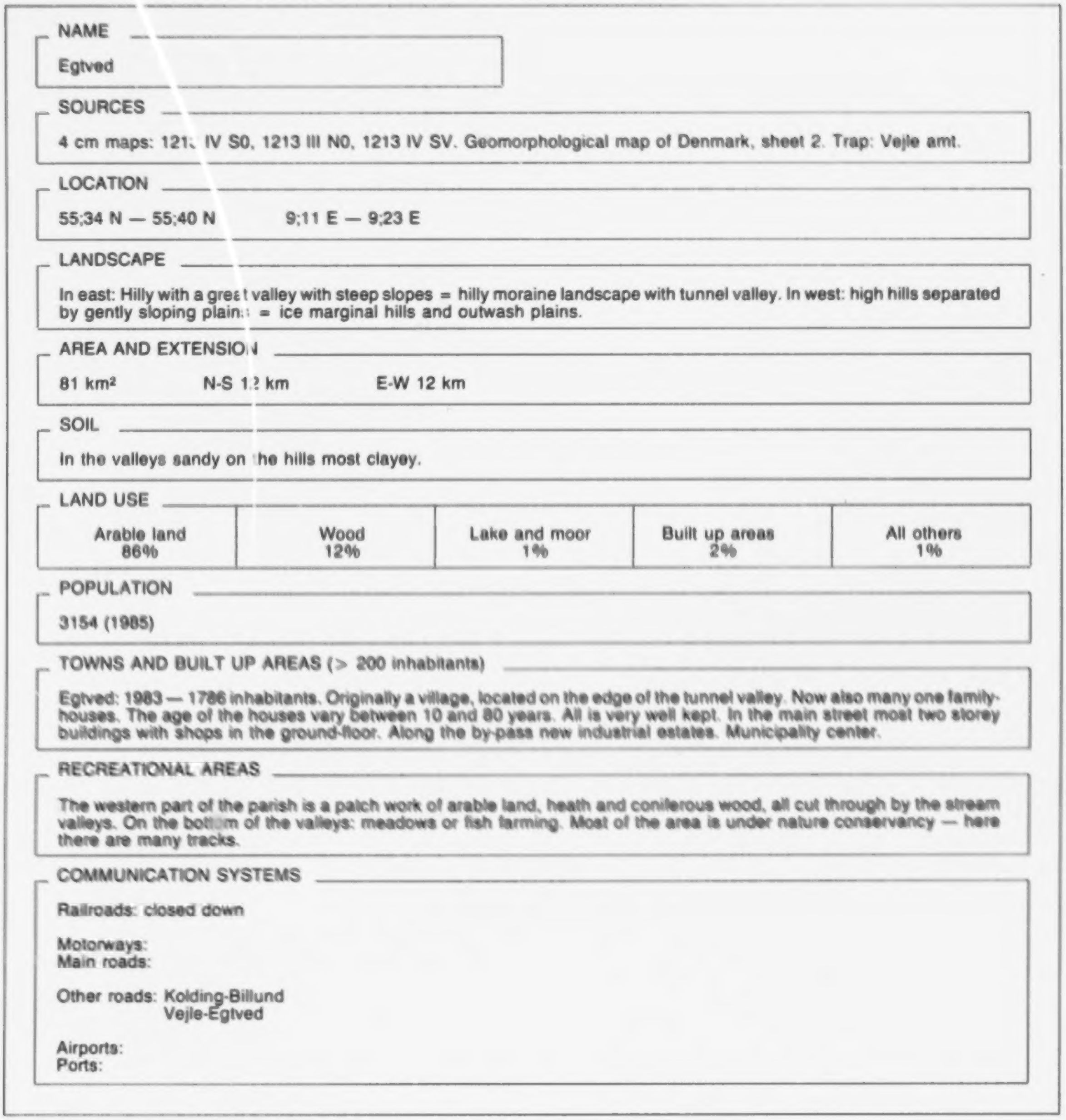
The study of regions and societies as well as environmental and local studies is supported by a variety of media - amongst them the personal computer. Standard programs such as spreadsheets and administrative database programs increase our capacity to store, present and analyse data when compared with traditional media. The INFA educational development work highlights the pedagogical implementation of the interplay between these memory and manipulative resources and other teaching media and resources. For this reason the databases indicate alternative map sources of information.

The use of spreadsheets and data bases aids local studies in three main ways. They facilitate:

1. the storing of large amounts of data,
2. presenting, comparing and analysing data, and
3. the elaboration of stored data as well as the creation of new environmental/local studies data through the use of the calculation functions.

In addition to the quantitative data stored in spreadsheets described by Larsen (Chapter 20), qualitative data may be stored in an administrative data base program. Such data bases may contain both physical and social geographical information.

Figure 21.1 shows the types of qualitative data which may be stored.



NAME

Egtved

SOURCES

4 cm maps: 1213 IV S0, 1213 III N0, 1213 IV SV. Geomorphological map of Denmark, sheet 2. Trap: Vejle amt.

LOCATION

55;34 N — 55;40 N 9;11 E — 9;23 E

LANDSCAPE

In east: Hilly with a great valley with steep slopes = hilly moraine landscape with tunnel valley. In west: high hills separated by gently sloping plains = ice marginal hills and outwash plains.

AREA AND EXTENSION

81 km² N-S 12 km E-W 12 km

SOIL

In the valleys sandy on the hills most clayey.

LAND USE

Arable land 86%	Wood 12%	Lake and moor 1%	Built up areas 2%	All others 1%

POPULATION

3154 (1985)

TOWNS AND BUILT UP AREAS (> 200 inhabitants)

Egtved: 1983 — 1786 inhabitants. Originally a village, located on the edge of the tunnel valley. Now also many one family-houses. The age of the houses vary between 10 and 80 years. All is very well kept. In the main street most two storey buildings with shops in the ground-floor. Along the by-pass new industrial estates. Municipality center.

RECREATIONAL AREAS

The western part of the parish is a patch work of arable land, heath and coniferous wood, all cut through by the stream valleys. On the bottom of the valleys: meadows or fish farming. Most of the area is under nature conservancy — here there are many tracks.

COMMUNICATION SYSTEMS

Railroads: closed down

Motorways:
Main roads:

Other roads: Kolding-Billund
Vejle-Egtved

Airports:
Ports:

Figure 21.1 Some of the qualitative information contained in the administrative database

1. Types of data recorded in the database program

A great deal of geographical information can be recorded in statistical form. Quantitative and qualitative data and descriptions supplement each other and make the picture multi-facetted. However, the qualitative data in the database program have been made comparable by using a somewhat standardized language involving the use of fixed adjectives and by referring to specific definitions.

2. General view versus details in social issues

It is very important to get a general view as well as a detailed insight into a social issue. It is seldom possible to get both by using the same information and methods. Obtaining a general or a detailed view is largely a question of scale. In order to manage this problem three databases had been established. These are databases for parishes, municipalities and states. At present the data bases only include Danish examples. However, the inclusion of other countries later will be easy. The parish is the smallest administrative unit that it is practically possible to work with. In the parish it is possible to obtain many details. In the states, on the other hand, one loses details but obtains a general view of the issue.

3. Sources and educational media

Those sources and media which are used in the educational process have to supplement and elaborate each other. The computer files and handling programs should only be used where they are better than those educational media used until now or where they fulfil other so far unmet needs. Teaching in local communities and environments still uses a number of conventional references and educational media such as maps drawn at different scales, illustrations, slides, statistics, textbooks and field work for the collection of the required data.

The subject matter of these two applicational programs supplement the conventional references and educational media as they fill a gap and at the same time open up the possibility of making comparisons, facilitate calculations and storing of all sorts of data.

4. Content of the database

The theme "society and conditions of life" is so comprehensive that only a few of all the potential aspects can be included in a data base program for school purposes. The final choice depends on the anticipated purpose of the data, accessibility and the limitations of the data base management program itself.

Descriptions of location, size and extent are necessary to locate any phenomena in space. Every society is located somewhere and has a given size at a given time. The two data bases use two different forms for describing the location of places: geographical longitude and latitude and the name of the larger administrative unit in which the place is located.

Physical and cultural landscapes play a key part in any society and in the condition of life. The character of the landscape as well as its utilisation are important influences on the way in which individuals as well as the society evaluate and appreciate it.

The description of the landscape is structured in such a way that immediate impressions either in the natural environment or from maps are recorded first and this is followed by a statement of geomorphological origins. Thus a description of landscape from the Municipality database might read:

"The western part is a plain which slopes gently from west to east. It is an outwash plain. The terminal moraine from the last advance of the ice cuts through the municipality from N. to S. The eastern part has a hilly landscape cut through by valleys with steep slopes and uneven bottom. It is a hilly morainic landscape with tunnel valleys."

The size of cities and built-up areas and the possibility of serving the inhabitants are important elements in a description of life in any given place. A description of a small town as recorded in the Parish Database reads:

"Egtved: 1983 - 1786 inhabitants. Originally a village, located on the edge of the tunnel valley. Now also many one-family houses. The age of the houses varies between 10 and 80 years. All is very well kept. In the main street most buildings are two-storey with shops on the ground floor. Along the by-pass there are new industrial estates. Municipality centre."

Recreational areas play an increasing part for the quality of life in a society/environment. The nature, size and location of recreational areas have to be compared with the population, location and age structure. The recreational areas in the parish of Egtved are described as follows:

"The western part of the parish is a patchwork of arable land, heath and coniferous wood, all cut through by the stream valleys. In the valley bottoms there are meadows or fish farming. Most of the area is under nature conservancy and there are many footpaths."

The use of the data bases in the project schools

In late 1987 and early 1988 the teaching of local studies and environmental studies will be carried out using the databases which have been described above with pupils aged from 13 - 16 years. The teachers will be supported initially by courses at the Geography Institute aimed at developing this teaching unit including the use of the application program, through planning meetings at the different schools and by the Geographical Institute which will make teaching materials available.

The framework for a teaching unit on the conditions of life in the local environment

The framework specifies the background for teaching about the conditions of life in the local area which:

1. Should give the pupils greater interest in, and knowledge about, their own local environment and society.
2. Place the near or local environment in its regional setting.
3. Give pupils the opportunity to use computers and applicational programs in their geography lessons.

The content of the teaching unit is limited to those aspects of the physical environment which most impinge upon human life. This has the effect that the teaching unit is not lengthy and pupils will get the chance to cover at least part of the planned course in detail.

Not everything included in the databases is of current interest to pupils studying everywhere in Denmark. The databases include a wide range of information and topics to enable teachers to select those topics which are most suitable to their own local community.

The suggested time scale in the plan is also variable and depends on such things as grade level and pupils' previous experience. Resources and educational media including application programs, geomorphological maps, topographical maps and air photos have been lent to the Danish project schools by the Geography Institute.

The structure used in the database archive sheets have been used to develop a teaching unit on the local community. The pupils begin each section of the topic by collecting data through fieldwork and other sources. The various data are sorted and an initial generalisation is proposed. The collected data is sorted partly by traditional methods and procedures and partly by the use of those calculation formulae included in the spreadsheet.

These data are also presented partly by traditional methods and partly through placing tables in the spreadsheet and filling in the frames in the archive sheet of the database. Figure 21.2 shows how the various sources of information are used by students to draw conclusions about their own, and other, societies.

The spreadsheet and database enable the pupils to:

1. Compare their own local community with other local communities.
2. See their own local community in a greater regional connection.
3. Communicate with other classes in other local communities.

1. After the pupils have filled in the archive sheet and spreadsheet with information about their own local community they can use the search function of the database program to recall archive sheets about other local communities which are similar to their own on one or more points. They can, for example, chose all those local communities which have the same number of inhabitants as their own local community and then compare several other parameters, find similarities and differences and reflect on the reasons for these. By

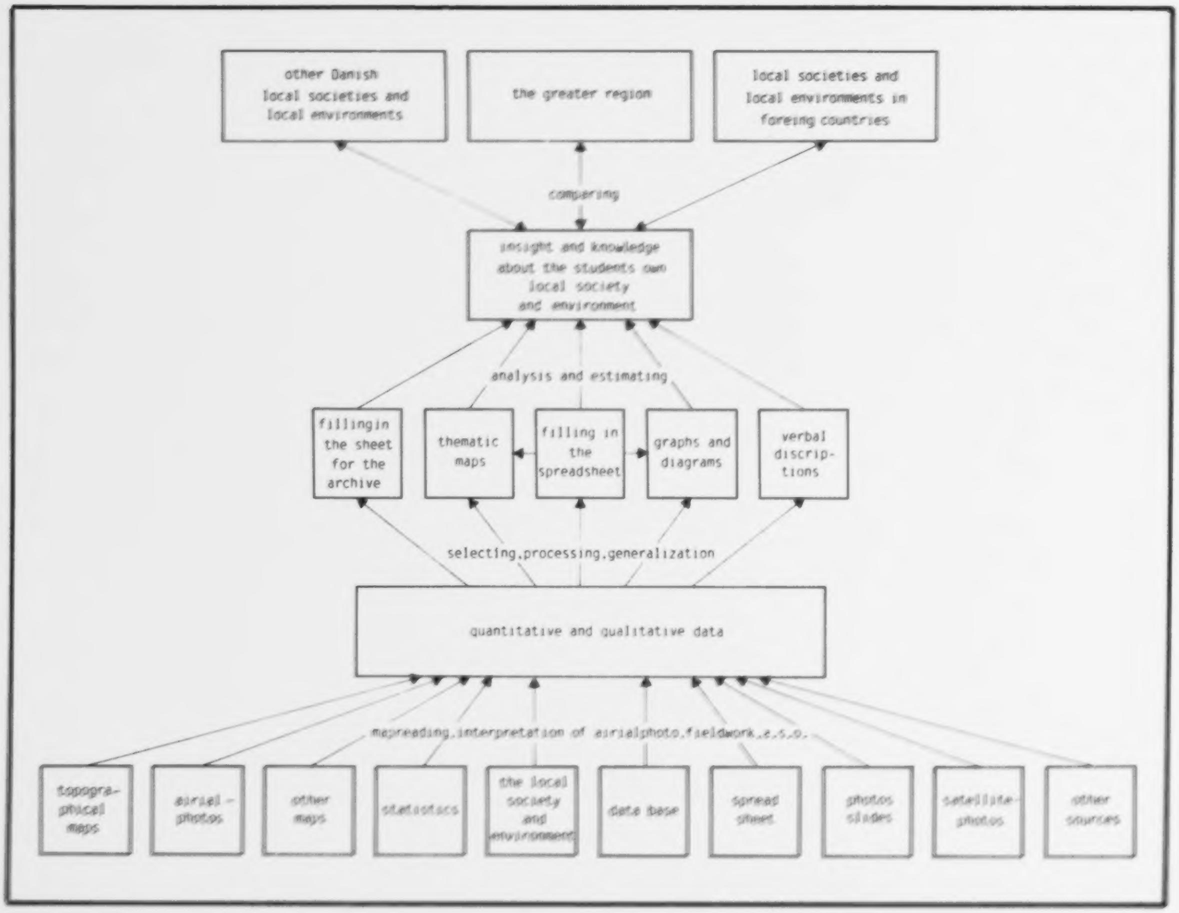

other Danish local societies and local environments
the greater region
local societies and local environments in foreing countries
comparing
insight and knowledge about the students own local society and environment
analysis and estimating
fillingin the sheet for the archive
thematic maps
filling in the spreadsheet
graphs and diagrams
verbal discrip-tions
selecting,processing,generalization
quantitative and qualitative data
mapreading,interpretation of airialphoto,fieldwork,e.s.o.
topogra-phical maps
airial - photos
other maps
statistics
the local society and environment
data base
spread sheet
photos slides
satellite-photos
other sources

Figure 21.2 The process of data management in the study of local and distant environments

means of the spreadsheet they can find statistical information about their own local community and compare it with other places.

2. The pupils can compare their own local community with the greater region by means of the county file in the database and spreadsheet. They can investigate the relationships between the different parts of the region and the influence of their own local community on the region.
3. Until the schools are linked into the national and international network, communication with other schools has to be made via postal services. The pupils send and receive data disks for the spreadsheet as well as the database. Once the network is completed schools will be able to transmit directly from their own computers to computers in other classes in other parts of the country or in other countries. In this way, pupils will have access to current information on living conditions in other, different, societies and countries as well as in their own country. The potential benefits of this aspect of the INFA project is not only that our pupils will gain more accurate perspectives on the living conditions of communities other than their own, but that their international understanding will increase.

REFERENCE

Skrifter fra Geografisk Institut (1985) *Informatik i geografi og samtidsorientering*, 9, Copenhagen, Royal Danish School of Educational Studies.

22: TEACHING ORAL AND GROUPWORK SKILLS IN GEOGRAPHY

Alan Jenkins and David Pepper

Imagine two geography classes. In one, groups of students tell their fellow students about the impact of present government policy on the geography of Britain. Their presentation may take the form of a speech, a simulated television program or a playlet. A few days afterwards each group meets its tutor to discuss the written self-criticisms of their presentation. The lecturer evaluates the presentation with the students, suggests the grade the group should receive for its presentation and guides the students on how to make their next presentation more effective.

In the other class, in a course on society-environment relationships, two student groups debate for and against the proposition that "Animals and plants have a right to existence of themselves; their value is not just a function of their usefulness to humans". Each group has a student 'advocate' who organises their side's argument and calls on the three other students in the group to present aspects of their case as 'witnesses'. The other students in the class and the lecturer act as 'jurors'. They judge the arguments, and which side has presented its argument most effectively. Each group gets a mark which forms part of the students' final assessment for that course. Next week the 'jurors' will be acting as 'advocate' or 'witness' and their group performance will be similarly assessed.

These two methods of teaching are but two examples of a variety of methods used in the geography programme at Oxford Polytechnic (Pepper and Jenkins, 1987) and will be described in greater detail later in this paper. These methods share similar aims and characteristics. They are student-centred, in that they are centrally concerned with developing the students' skills and knowledge. Though the teacher has probably been central in devising the activities, in the classroom s/he generally plays a subsidiary role. We regard such methods as crucial to the students' intellectual and personal development and also to their future employability. The skills which they particularly develop are in speaking and working effectively in groups.

It is an important aspect of their education for students to develop skills of working in groups and communicating the results of their work orally. In groupwork, students cannot avoid confronting a whole range of intellectual and personal tasks - they have to define the problem they have been set, to break it into its components and then to seek out and analyse information, putting it eventually into a broader conceptual context. The group context, by contrast, usually means that methodological questions are highlighted: because a task is split up and shared among the individuals, it becomes essential and inescapable for group members to know why they are doing what they are doing, and when individual contributions are put back together into the final presentation it becomes essential that they form part of a logical structure whereby the original problem is presented, discussed, illuminated by evidence and 'solved'.

In the verbal (or audio-visual) presentation, clarity of thought and language and logic of structure also are highlighted. The struggle for such clarity and logic, and its final achievement, is a liberating process for the individual and the group. At the same time, the prospect of having one's work held up to public examination, to a friendly but critical audience (that can become only-too-easily bored), acts as a powerful incentive to prepare thoroughly, and to know what one is talking about in terms of subject matter.

Another reason for developing these skills is that geography teachers do need to consider the employability of their graduates in what is essentially a non-vocational subject for most students. Teaching methods that highlight autonomous learning and problem-solving enhance the development of adaptability and versatility in students will allow them to become more employable. As well, 'personal transferable skills' which the above methods foster become highly sought-after: skills and attributes like motivation, strong character, ability to solve problems both by analysis and synthesis, ability to work as a member of a team, and to speak and write effectively.

Guidelines for teaching group work and communication skills

Because many geography teachers have had little training in developing these skills, the following principles may provide effective guidance for teachers in their geography classes.

1. Define your role clearly.

Teaching these skills can involve changing the teacher's traditional role from a provider of information and instruction in geography to a 'facilitator' of student learning and skill development. This involves:

a) setting out the course content in consultation with students,
b) helping the students to define the key areas to investigate and the questions to ask,
c) assisting students to locate them,
d) providing organisational and administrative support,
e) choosing, negotiating and devising appropriate methods.

We find that since students are likely to enter the classroom expecting us to be just such an authority on subject matter, and to act in an authoritarian manner (Peters, 1966), we must clearly show that we will rarely, if ever, do this but will instead guide students to take authority for their own learning (Jenkins, 1985). Hence in a course that strongly features student-led debates, as described above, we open with a session where students discuss a contentious issue in the absence of the teacher. In such a no-tutor' session (Webb, 1980), the teacher sets up the task, and will subsequently listen to a tape recording of the session and then make written comments on the students' discussion. But the essential message of a course that starts this way is that it will require students to be centrally responsible for their own development.

2. Give explicit guidance.

The appropriate methods will not work effectively unless explicit guidance is given to students so that they become active, and not passive, learners. Since they usually have to do considerable work before they enter a classroom - for example, where a group has to present the Church of England's view on the problems of the inner city - they must know precisely what is required of them, by way of information sources, processing and communicating the results.

Teachers should ensure that although in a particular exercise individual students may take on specialist roles, over the period of a course all students will eventually take them on. For example, in the course which features debates, every student has on one occasion to act as the 'advocate' for their side.

A requirement for this to happen can be build into the assessment of, as well as the guidelines to, a course. So, in the class where groups have to do an assessed presentation, the instructions should make it very clear that all of the group have to be involved in the presentation. Should that presentation be brilliant, but dominated by one person, then it will be marked down.

4. If it is important, assess it.

Sound curriculum planning demands that the system of assessment should match the (stated) course objectives. If it the aims include effective speaking and group work, but only a written examination is assessed it is unlikely that students will put much effort into the sort of exercises described here.

The assessment of these skills can present problems, such as claims of subjectivity. We answer that, in principle, nearly all marking is subjective; even the marking of a traditional essay assignment. However, we also try to make very clear what are the assessment criteria we will use, and afterwards will generally make clear the reasons for our mark. In some cases, we believe that it is important to discuss and negotiate on a mark. In the debate 'court of enquiry' format described here the vote of the 'jury' will be important in influencing the tutor's mark, but however it is done it is usually important for students to have an input into the assessment process.

It is important to be sensitive to the fact that one reason why students might be uneasy about the subjectivity of the marking of a speech, is that their own sense of self-esteem is often very much on the line. We will try to ensure that our comments are positive and helpful, to establish an atmosphere where students' self-confidence, and self-criticism, can thrive.

In a project done by a group, generally all members of the group get the same mark, regardless of the effort they individually put into the exercise. This can create major difficulties, where some group members do not 'pull their weight', but the situation faithfully reflects a common experience in the world of work. To make students primarily responsible for coping with it, therefore, considerably enhances employment-relevant skills.

5. Encourage student self-assessment.

One way to make the problem of the subjectivity of marking more recognised and acceptable is to involve the students in assessing their own performance, to the extent of their suggesting a grade. This is an important means for getting students, individually and collectively, to take responsibility for their own learning.

6. Start small, aim big and wide.

Initial success with student-centred experiences is important. Therefore, it is probably sensible to start with a small exercise and then with confidence and experience gained, the lecturer and the students will be prepared to try more challenging autonomous learning experiences.

7. Do give guidance.

Teachers must give students effective guidance on achieving proficiency in speaking and group skills. Students need to know what makes for an effective speech, how, as an 'advocate', to ask questions that test the other side's evidence, and how to work effectively as a group. One way to give such guidance is to set up models of good practice. A difficult area in which to give guidance is on working effectively in groups. The central problem here is in the multiple processes and feelings that are developed within a working group and the depth of feelings that can be engendered. Even within friendship groups there are conflicts. A potential solution to these problems is to have groups of students examine specific problems (both academic and personal) and to decide how to meet them.

Evaluation and staff development

Perhaps the most practical question to ask about these approaches is: Do they work? Do they help students to develop these personal transferable skills? Do they enable them to learn geography more effectively than 'traditional' methods and do they enable them to gain employment and over the long term be more fulfilled people?

1. The evidence from evaluation

Discussions with students after they had completed activities using these skills revealed the following observations:

a) Students who are initially shy and hesitant in debate become, more often than not, assertive and effective.
b) Students' comments about these approaches are overwhelmingly positive. Though they frequently say that their first debates or presentations terrified them, they generally believe that they have learned to relax and speak effectively.
c) Students suggest that they learn the subject matter of geography more effectively this way than through traditional methods. Perhaps less subject matter is covered than in a traditional lecture-based course but what is learnt is learnt in depth.
d) Students learn the geography content through these methods using much more energy and enthusiasm that for traditional methods. Initially they may in part be driven by fear. But the students do eventually experience excitement, enthusiasm and enjoyment when taught this way. They also begin to appreciate the difficulty of working in groups.

Whether students do become better at obtaining employment and are in the long term more fulfilled people, we really do not know. We have not impressionistic comments from students that they are comfortable with the methods which prospective employers use to interview them. We also have quite frequent feedback from former students as to the value of these methods in their present jobs.

2. Staff time and staff development

In discussing student-centred methods with colleagues in other departments two recurring questions are:

a) "Do not such methods involve far more preparation?" and
b) "Can we really teach this way without an extensive staff development program?"

Unwin (1986: 156-7) concluded that geography departments need to develop these methods of teaching but he doubted that many would. He noted the pressure (in the UK) on departments to show that they are doing outstanding and relevant research and that the limited prospects for individual promotion and prestige were a function of the number of publications and research grants.

Hence, staff might agree on the importance of non-traditional teaching but they would not do much to implement it for "most of the suggestions made by employers in this survey require considerable time and effort on behalf of the teaching staff, and the time available for them is being worn away by other demands".

Case study 1: Group presentations

At Oxford Polytechnic, groups of 2-4 students following courses in political geography, contemporary China and introductory human geography prepare a spoken presentation on an issue they have researched themselves.The main purpose of this is three-fold:

- to develop students' ability to work in groups,
- to carry out a limited piece of research, and
- to encourage students to speak in public.

The role of the teacher

- Define a set of linked issues suitable for analysis by groups of students, e.g. the impact of the Conservative Government on aspects of the geography of Britain.
- Assign students to groups of 2-4 and assign topics. (Alternatively, you can allow students degrees of choices over topic and who they will work with).
- Give the students guidance on suitable methods of investigation and sources. Give them guidance on how to work in groups or warn them of the likely problems they will face.
- Clarify the 'rules' for the presentation.
- Give them guidance on how to do a presentation.
- Arrange to see (insist on it) groups periodically while they are researching and before they give a presentation.
- During the presentation act as chair and insist that time limits are obeyed. Encourage students to ask good hard questions and, as chair, ensure that questioning is not dominated by a few.
- Make clear either that you will ask no questions or that you will only ask the final one and that groups cannot get high marks unless their colleagues ask penetrating questions.
- Make notes on the quality of the presentation (and the content). Mark the presentation. See the students to discuss the quality of the presentation and how they worked as a group and possibly the topic itself. Announce the grade and your reasons for giving it.

Some possible problems for the teacher

- While two students may make co-operation perhaps too easy, more than four can make it too difficult. (Obviously the complexity of the task and time allowed and numbers of students in the class can affect the group size decided upon.)

- While giving too little guidance may give students freedom and a sense that it is their own work, it can also lead to confusion and little being achieved. You will probably see only the tip of the iceberg of what students are doing and what problems they are having. You can insist on seeing the group periodically or at least once before they do the presentation. You can set aside class time (or a specific time in a field course) for groups to meet. However, this can mean you are intervening too much. It can be valuable for groups to go through periods of feeling that people are not doing their share of work, meeting deadlines etc. The group has to become responsible for itself.
- There is a limit to the number of presentations people can take at one sitting.
- Presentations may be relatively ineffective at getting information across. One way to ensure that the content is learned is to assign further reading and/or seminar discussion.
- Getting the audience 'involved' in the exercise can be a problem. One way is to make very clear that you will not intervene to ask questions and that presentations will be in part assessed on the quality of their answers to questions. Another is to involve all students in the assessment. After a presentation each student group can be required to discuss and even assess the presentation. It's an exercise that lends itself well to a combination of staff and peer assessment.

Some extracts from student handouts on the group presentation procedure

Assignment: The geography of Thatcherism

The present Conservative government came to power in 1979. In this assignment we will assess the impact of this government on the geography of Britain.

In groups of 3-4 you will research one aspect of the geography of Britain. You will seek to establish the extent (if any) of the impact of the Conservative government on the geography of:

a) manufacturing
b) regional policy
c-n) other topics on aspects of the geography of Britain

Each group will be responsible for making a class presentation on its topic. The presentation will last 30 minutes which includes at least 10 minutes for questioning. You can choose any method of presentation you consider appropriate, e.g. lecturettes, panel discussion, simulation or play. You will be marked as a group on your presentation, i.e. each member of the group receives the same mark. The mark will be allocated only after you have together completed the self assessment form and seen me together to discuss the degree of success of your presentation. It is your responsibility to arrange an appointment with me. I will not see a group unless all its members are present. Failure to see me will mean that you will get no marks for your presentation.

Student self assessment of presentations

a) What did you consider to be the strengths of your presentation?
b) What were its weaknesses?
c) If you had to give the same presentation again, what specific changes would you make?

Case study 2: Courts of enquiry

This is a very effective and enjoyable debate format where two 'advocates' argue for and against a proposition, each backed by their own team of 'witnesses' (after a BBC Radio programme called 'You the Jury').

The particular benefit of this approach is that it helps students to improve their skills of speaking in public (interview technique) and of working in a group. It also serves to sharpen powers of argument, to encourage the assimilation of seminar material by all members of a group and full participation by all students in seminars. The approach has been used in courses on history and philosophy of geography, on issues of way and peace and on environmental issues.

The role of the teacher

- Divide the class into appropriate sized seminar groups (12 or 14 is best) and ask them to work out a schedule for themselves, so that each team member will be an advocate once, witness three times, and jurist three times.
- Work out a list of 'contentious' propositions such as 'Animals and plants have a right to existence of themselves; their value is not just a function of their usefulness to humans' or 'Britain's security would be increased by unilateral nuclear disarmament'.
- Find and supply copies of at least 3 short (10-15pp) pieces of reading which can be used to support the case, and another 3 which can be used to oppose it. They should not overlap too much with each other. If necessary, produce and give out supporting and explanatory notes.
- Be ready to brief the advocates for each week. Make sure advocates are briefing their witnesses (i.e. giving the witnesses a reading each) and are reading themselves, to get an overview of their case.
- Make sure the groups are getting together several days beforehand to rehearse their cases.
- Arrange 2-hour seminar blocks, in suitable rooms, with two lines of tables, and a line of tables at the top for the jury and judge (you).
- Judge the case made by each side. Keep time. Make sure no-one is reading unduly from notes. Do not let cross-examinations get too aggressive, or any arguments get too circular. Make sure the jurists get a chance to ask questions. Be prepared to ask your own questions, in order to bring out key points in the arguments. Watch out for any witnesses whom the occasion may be too much and be prepared to help them. See that there is fair play, and procedures are followed.

- Make notes for the wind-up session, on both content and presentation. Get students to criticise their own presentations and arguments at the end. Give guidance on what you are looking for when marking. Keep control, but do not dominate - ideally your role should be minimal.
- Give a mark to each individual in each team e.g. out of 10 for an advocacy; out of 5 for a witness.
- Make a tape recording of the proceedings, for people to hear what they were like and learn (and for the external examiner).

Some problems for the teacher

- Getting appropriate-sized groups together. Finding appropriate readings for and against a proposition. Doing three different things simultaneously while the courts are in progress (listening to the case and how it is presented, keeping time, allocating marks as the court proceeds).
- Managing group dynamics - keeping order firmly and fairly.
- Marking fairly (total objectivity not possible).
- Making sure that people only ask questions of witnesses. It is largely up to groups themselves to work together, organise themselves out of class and pull their weight as individuals, but the teacher must be prepared to help overcome difficulties and crises.

Some extracts from student handouts on court of enquiry approaches

- Each seminar group splits into two sides, consisting of 1 'advocate' and 3 'witnesses' each. Hence, each week in the Court, 8 members of the group are actively involved. The rest of the group, plus tutor, form the jury.
- The two sides debate contentious propositions. One side argues FOR the other AGAINST.
- Each side's case is conducted by the advocate, who:

  a) introduces his/her case
  b) sums it up
  c) questions each of the witnesses on his/her side
  d) leads cross-examination of the other side's witnesses, and
  e) has an overview, in other words, of the whole case and what each witness can contribute.

- The (expert) witnesses have each spent time before the court reading up, or otherwise mastering (e.g. they might have been listening to a tape of a broadcast or speech), specific aspects of the case. Their job is to tell the court what they know, in such a way as to support the advocate, and their side's case. They do this only in answer to the advocates' questions - they must not give a long, uninterrupted speech. And they must not read out their answers. Penalty points will be awarded publicly by the lecturer for any witness who reads out his/her notes, except where a quotation is being given. Brief notes only are allowed for consultation. Each witness will be cross-examined by the other side, and possibly by the jury.
- The Courts of Enquiry last 2 hours.
- At the end of the enquiry, the jury votes to see who has won, on the basis of (a) the arguments presented - how well-researched, and supported by evidence, and (b) the style of presentation - was it put together convincingly, did it stand up to examination, were witnesses and advocate arguing clearly, with conviction, and were they speaking clearly and to the court?
- At the end of the Court the tutor, as 'Judge' will sum up, giving impressions of how good the arguments were, and what were the strengths and weaknesses of presentation.
- The whole event is tape-recorded for the benefit of the External Examiner.
- There are two roles which each student can play - advocate or witness. Tutors will give some guidelines on what to read and where to look, but advocates, especially, and also witnesses, will have to think out their arguments for themselves and be prepared to research a line which has not been indicated by a tutor. When not role-playing, all students must serve on the 'jury'.
- The advocate, once appointed, has to act as director/ co-ordinator of the whole of his/her side's case. We lay down the following rules for each group:
  a) Once a seminar group has split into two sides, the sides remain generally the same for the duration of the term.
  b) In each of the courts, each side must have a different advocate for each proposition.
  c) Each member of the side must be an advocate once and a witness three times (normally) during the course.
  d) People who are not performing on a particular day, and are therefore part of the jury, must be neutral in hearing the case and must vote objectively!

REFERENCES

Pepper, D. & Jenkins, A. (1988) "Enhancing Students' Employability and Self-expression; How to teach oral and groupwork skills in geography", *Journal of Geography in Higher Education, 12 (1).*

Peters, R.S. (1966) *Ethics & Education*, London, Allen & Unwin.

Unwin, T. (1986) "Attitudes towards geographers in the graduate labor market", *Journal of Geography in Higher Education*, (10), 149-158.

Webb, G. (1980) "Student Participation in Tutorials", *Journal of Geography in Higher Education*, 4, 16-22.

ACKNOWLEDGEMENT

A longer version of this article has been published as Occasional Paper No. 49: *Enhancing Employability and Educational Experience* available from the Standing Conference for Educational Development, Educational Development Unit, Birmingham Polytechnic, Perry Bar, Birmingham, U.K. for £4.00 (incl. p & P) (£7.50 if payment is made in currencies other than sterling).

23: DEVELOPMENT ISSUES:SYMPATHY AND PATERNALISM, EMPATHY AND REALISM

Roger Robinson

Sympathy, defined in the Oxford dictionary as "the mental participation in another's trouble, compassion, commiseration" and the skill of empathy, defined by the same source as "the power of projecting one's personality into the object of contemplation", are often mentioned by geography teachers in the Aims sections of the geography syllabuses that they design for their schools. However, these qualities have received no explicit reference in the GCSE National Criteria for Geography (D.E.S., 1985), although several of the national aims imply that the development of these qualities should be central to school geography, for example:"to encourage an understanding of different communities within our own society and elsewhere in the world" and, "to encourage an appreciation of the significance of the attitudes and values of those who make decisions about the management of the environment and the use of terrestrial space".

Understanding and the appreciation of the significance of other communities' cultures, values and attitudes are virtually impossible without some degree of sympathy and empathy. The nearest that the Department of Education and the Schools Examination Council (1985) came to being explicit was in a working paper on the *Domains of Geography* where it was stated: "students should appreciate that different groups of people perceive these issues (economic, environmental, political and social) in different ways according to their own values and experience."

Any discussion with students about the wider world soon gives rise to statements created or at least coloured by sentiments of sympathy and by the ability, or lack of ability, to empathise. Sympathy and empathy are part of the context for any understanding or assessment of other people and places, and must be a focus of concern for geography teachers.

The context within which students sympathise and empathise are created from both instrumental and regenerative knowledge. Instrumental knowledge is always legitimated in classrooms and involves an empirical-analytic mode of thinking. Its boundaries are well defined, and it is used for a specific purpose. Regenerative knowledge, on the other hand, is based on collectivity and interdependence in a social group, and interaction and communication are used to create knowledge. It is a major form of knowledge outside the classroom, but is seldom legitimated inside it. The contrast between these forms of knowledge is important in any discussion of the way in which students apply their learning to issues of the wider world.

Explicit attitudes to development in the developing world

Feelings of sympathy, the ability to empathise, the degree of paternalism and of realism in people's perceptions, are given tangible form in their attitudes towards development issues. The negative and stereotyped images and perceptions brought to the class-room by young teenage students have been convincingly documented by such workers as Binns, (1979), Boyle, (1983), Gill, (1983), Marsden, (1976), Storm (1983). The almost incredible lists of racist, ethnocentric and ignorant suggestions offered in free response by students under 14 years old are a product of a most unsatisfactory situation. Some of these attitudes and inaccuracies have been attributed to bias in textbooks (Hicks, 1980; Kent, 1982; Richardson and Taylor, 1980; Wright, 1982), but many come from television, comics, family and friends. The situation is not, however, hopeless, and by the time students reach the 14 to 16 year age range there may have been improvements. A questionnaire administered to a sample of 14 to 16 year old students in English Secondary Schools (Robinson, 1986) revealed less negative attitudes. It explored the issue of rural poverty in Africa and India and its possible causes and remedies.

A majority of students agreed that climate and rich people in their own country are causes, and that poverty is certainly not the farmers' own fault. A smaller majority blamed the power of rich nations but less than a quarter blamed colonialism.

The colonial and often racist assumption that laziness and stupidity are the main causes of poverty in developing countries ("their own fault") has almost no credence, perhaps thanks to coverage of the Ethiopian and Sudanese famines by the BBC. On the other hand, Oxfam's recent campaigns have apparently had less success in presenting reasons other than drought for rural poverty. Oxfam has followed well-established research into the causes of famine, typified by that of Sen (1981), which shows clearly that drought is at most a trigger for famine, not a prime cause. The students however, being asked not even about famine but about long term rural poverty, still cling to climate as an important cause. Their perceptions of the vast areas and variety of Africa and India are dominated by images of extreme environmental conditions in marginal areas. The millions of poor farmers living in well-established, well-watered, fertile areas have not received the same media and classroom attention.

Questioning about huge areas like Africa or the Developing World invites responses involving broad generalisations and stereotypes. Individual interviews (Robinson, 1987) with some forty students aged 14 to 16 years provided evidence of much more sophistication and thoughtfulness, and these are the basis of the discussion that follows.

The links between sympathy and paternalism

Sympathy and paternalism ran hand in hand throughout discussions with individual students. Almost all the students expressed their sympathy for the poorer people in the Developing World, sometimes explicitly, but often implicitly in their comments on life and how it could be improved.

Some of this sympathy was a direct reaction to the situations in photographs that were used as stimuli to the discussion, for example one of a girl collecting water and carrying it a long way, but most of it was based on negative images of the Developing World already held by the students, and it was often generated within an attitude of paternalism.

Sympathy is a human emotion which most educators would wish to encourage, leading as it may to less selfish behaviour and a caring attitude towards other people. But the form of sympathy that shows itself as being "sorry for someone" can be counter-productive and leave the recipient in a state of insecurity, dependence and inferiority. Unfortunately, the sympathy expressed by people in the Developed World for those in the Developing World is often of this nature.

At the end of each interview the student were asked what they thought was the value of learning about the Developing World. A fifth of the students felt that its main effect was to clarify their own position in the world - make them "grateful" that they are "well-off" and "lucky":

Julian: "I think it helps us to understand how well-off we are, doesn't it? Seeing areas like that. Sometimes we're a bit short of money, people don't think they're doing as well as they can, but when they see areas like that they feel sorry for them. It could help. Geography ought to encourage some people to sort of try and do something about it." Only one student added "and angry":

Deborah: "It makes you realise you are better off than lots of people, and it makes you appreciate you've got a bit more. And it makes you sort of slightly angry that you can't do anything to help."

A further six students indicated that it would in some way enable "us" to help "them". For example:

Joan: "Then you can learn how to cope with countries and see if we can improve them or something."

Learning about the Developing World had reinforced an attitude of superiority for more than a third of the students. This, mixed with a desire to see improvements or to help, created a paternalistic context for their ideas.

Even the eight students who thought the main function of learning about the Developing World would be the changing of attitudes, looked for some paternalism in the attitudes they hoped would result:

Sharon: "So we not only learn about our way of living, but, in less developing countries, the way they live, about the jobs and the way they have to cope. Instead of our way of life, just sitting back. Maybe it will make us feel that, you know, there's people worse off than us and we'll maybe try and do something about it."

Gregory: "Instead of just saying 'Oh, don't worry about them', might make you change your tune. Help them out, give them a hand."

One student explained that his own attitudes had been changed by his geography lessons:

Paul: "It gave me a different feeling for the world. Because like I used to, like before I was taught geography, they were on about the Third World and everything. Like say people starving. I didn't take much notice. And then you find how hard it is to get by."

He had developed a strong sympathy through an awareness of poverty, but this had also a strong flavour of paternalism.

All the eight students hoping for a change in attitudes felt that this and increased awareness would lead to action to improve conditions. Two other students mentioned political action (rather than the "aid" implicit in many statements):

Mandy: "Might learn more about how politicians work, towards other countries, might help you when you elect people."

Margaret: "The government's not going to change it now, we've got to do it when we're older, so learning about it when we're young will give us more chance ...."

A few students were definitely not paternalistic in their attitudes - two mentioned that "people are all the same".

The remaining students (about a third) emphasised the value of knowledge for its own sake - "its better to know" - and three or four mentioned a practical value for business or for visiting the Developing World.

There is, then, in our students, a great fund of sympathy, even love, for their fellow humans waiting to be harnessed. The generous responses from young people to appeal to alleviate famine in Africa suggest that this is true around the world. The sympathy is however partly blighted by attitudes of paternalism and superiority, and its potential as a power for changing the situation of the poor is further limited by a lack of realism in the context within which it is generated.

Empathy and realism

An antidote for paternalism may be the development of a realistic empathy for people in the Developing World, and this is a challenge for school geography.

Empathy for the purposes of this discussion may be described as the "ability to put yourself in someone else's place, and to feel and think as they do". It is the willingness of a student to attempt this, rather than its attainment, that would be an indication of success for the teacher. Indeed it may be argued that complete empathy is impossible with even a close friend, let alone someone of another culture thousands of miles away (Oram, 1984).

Empathy usually starts with a comparison of the other person's situation with your own and with situations that you have experienced, followed by a judgement of what your response and feelings would be if you were in that situation. To do this at all you must be willing to value the other person equally with yourself - to change places mentally - so that any attempted act of empathy will lessen tendencies towards paternalism or superiority.

Many of the students were able to demonstrate empathy in their modes of thought when responding to photographs. They were especially able to relate to people of their own age. At least ten of the students explicitly empathised with people during discussion.

Typical examples come from comments on the lifestyle of the Kenyan girl collecting water:

Julian: "Well, its a back-breaking job, isn't it? Carrying water. All those steep slopes as well. I wonder if she ever drops any? Be in trouble from her mother." and later: "She could maybe do a job within the community. Cleaning houses, or something like that. Doing gardens."

Julian thinks of the girl as a real person, and transfers from his own experience of life (trouble with mother, cleaning houses, doing gardens) to cover gaps in his knowledge of her milieu.

Margaret: (In response to "What do you think of this girl's life style?")

"Bad. Because my mother does a pile of washing every Sunday. I mean, she wouldn't go down to the river with it all. I don't think they have anything like an iron, or, it would be cold water. Do the washing in cold water. It would be bad I think. Although, from the style of clothes, she needs to be quite rich."

Margaret goes into realistic detail about something specific (washing clothes) and relates it to new circumstances and what it would be like to be involved in it. She finds the mismatch between the quality of the clothing and the technology of the washing difficult to reconcile, perhaps because her images are structured through strictly western affluent systems.

Further insight into the nature of empathy in this context comes in responses from Dick and Katie:

Dick: "She probably has to do quite a lot of work. She gets up early in the morning. Perhaps to look after young children, and she'll be up till late at night, until Mum and Father get in. And then she'll probably have to cook for them, well, she'd have to get them something to eat and drink."

Dick's afterthought shows he is aware of the differences that may exist in the preparation of food in another country, but it is the similarity of domestic life around the world that makes his implicit empathy with the girl quite realistic.

Katie: "They still have to traipse through here. And because she's a girl she is probably put upon to do this kind of heavy manual labour. I can't see her being allowed to go out and do what she wants."

Katie's images of the Developing World are more realistic than those of most of the students, though several share her sympathy for women's situation.

The students quoted above are able to empathise with the girl, though the empathy is so bound up with sympathy that it may be impossible to disentangle the two strands. The empathy is, however, limited because in most cases it suffers from a lack of realism. The element of comparison with their own lifestyles means that for the most part the "exchange of places" is enacted entirely in the context of their own value system and personal experience. The lack both of regenerative and of more formal knowledge of life in the Developing World adds to the confusion because the situation is judged in an imagined world of their personal geography that has enjoyed a minimal input of scenarios from the "real" world. Thus the empathy is founded in false environmental, social and personal contexts.

Prospects for developing realistic empathy

It is no easy task to provide students with the opportunity to develop their skills of realistic empathy. In the area that is under discussion here, and for the kind of empathy that may be a possibility, several prerequisites may be listed:

1. a willingness to accept the other person as an equal
2. an understanding of the context within which the other person lives (social, environmental, economic and political), and

3. an acceptance that the other person's value system and "way of looking at things" is a valid alternative to one's own.

The interview evidence suggested that the first prerequisite was satisfied in at least the majority of cases. The second is far from satisfied and is an area where school geography can do much more. The third is deep-seated and very difficult to accomplish in our ego-centric cultural mores, it demands the negation of "self righteousness" (Tippett, 1986). The recurrent use of the word "proper" in discussion when describing some aspect of one's own culture was a clear symptom of the problem.

Regenerative knowledge is particularly valuable as a source of understanding the context within which another person lives. The universal nature of domestic chores led several students into a realistic context for their comments on the every-day life of the Kenyan girl. Secondary experience, often based on television, can provide regenerative knowledge to give a realistic context for comments on a particular place. For example, James' comments on Kenya:

James: (Discussing modernisation with the photograph of the Kenyan girl) "Well they've got tupperware and things to carry the water"

Q: "Where do you think they got them?"

James: "I would have thought it would have been from aid from other countries, or, unless, well, you said it was Kenya? In some parts of Kenya they are well off, so there could be certain things that are bought there."

Conclusion

Generally the personal geographies of most students, built mainly from limited regenerative knowledge, are sadly lacking in realism or variety. It is in this area that school geography seems to offer very little in its present form.

Even "realism" is in the eye of the beholder, and it is cautionary to note that two of the students with personal experience, and therefore presumably "realistic" images, of the Developing World - Robert who visited Sri Lanka and Susan who had stayed in Jamaica - still occasionally expressed their sympathy in paternalistic terms, in spite of a well-developed and realistic empathy. Rajinda, who stayed with her family in the Punjab, did not slip into this attitude. It is however an attitude which seems to be typical of affluent people the world over.

Realistic empathy may not counter paternalism completely, but it seems that sympathy without it is almost certain to involve paternalism.

REFERENCES

Binns, J.A. (1979) "How "we" see "them" - some thoughts on Third World teaching", *Teaching Geography*, 4(4).

Boyle, C. (1983) "The Third World versus Modern Civilisation", *Teaching Geography*, 9(2).

Department of Education and Science (1985), *G.C.S.E. National Criteria*, London, H.M.S.O.

Gill, D. (1983) "Anti-racist Teaching through Geography", *Contemporary Issues in Geography and Education*, 1(1).

Hicks, D. (1980) *Images of the World: an introduction to Bias in Teaching Materials*, London University, Institute of Education.

Kent, A. (ed.) (1982) *Bias in Geography*, University of London Institute of Education Occasional Paper.

Marsden, W.E. (1967) "Stereotyping in Third World Geography", *Teaching Geography*, 1(5).

Oram, W.R. (1984) *Empathy and curriculum studies: conceptual analysis and practical application*, Ph.d. Thesis, University of Birmingham.

Richardson, R. and Taylor, N. (1980) *Teaching about Interdependence*, Teachers' Booklet Change and Choice, C.W.D.E.

Robinson, R.J. (1986) *Perceptions of Poverty*, T.E.S., 5.12.86.

Robinson, R.J. (1987) "Exploring Students' Images of the Developing World", *Geographical Education*. *5 (3)*.

Schools Examination Council (1985) *Domains of Geography*, London, H.M.S.O.

Sen, A. (1981) *Poverty and Famine*, Clarendon.

Storm, M. (1983) "Perception of the Third World", in Bale, J. (ed.) *The Third World - Issues and Approaches*, Geographical Association.

Tippett, M. (1986) *Interview with John Clare*, BBC Radio 3, 9.8.86.

24: CIVIC EDUCATION THROUGH GEOGRAPHY

Yee-wang Fung

Since the publication of *Frontiers in Geographical Teaching* (Chorley and Haggett, 1965), there has been a gradual shift in the emphases of geographical education in the English-speaking world. School geographers' attention was first diverted from regional studies to quantitative, hypothesis-testing and model-building methods in the seventies, and further geared towards phenomenological, humanistic and radical approaches in the eighties (Graves, 1984; Wiegand, 1986).

Concomitant with these developments has been a steady increase in the importance attached to values education in the teaching of geography. Values may be classified as behavioural, procedural and substantive. It has been pointed out by Fenton (1966) that teachers should teach about substantive values, but not the values themselves. Other educators, such as Lawton and Dufour (1973), however, believe that there are certain substantive values which the schools have a duty to transmit. The practice of democracy is one of them.

Over the years, many strategies have been developed to help pupils acquire values. These include the values clarification strategy (Raths et al, 1966), the values analysis strategy (Metcalf, 1971), and the values enquiry strategy (Hart, 1982).

In Hong Kong, as in many other developing areas or countries, recent years have witnessed a rising demand for a more democratic government. In order that this demand may be realised, the public in general and the pupils in particular must be given opportunities to learn about democracy and to practise it.

Since the publication of the White Paper on *The Further Development of Representative Government in Hong Kong* and a document entitled *Guidelines on Civic Education in Schools* (Secretariat, 1984 and the Education Department, 1985 of the Hong Kong Government respectively) democracy has become one of the most important substantive values to be promoted in secondary schools. Geography has an important role to play in this endeavour.

The present study attempts to demonstrate that it is possible to teach democracy in a geography lesson on a seemingly value-free topic, namely, grid reference and conventional signs, by using an experiential approach.

The design of the lesson

The lesson is designed for twelve-year old pupils at the Form 1 (Year 7) level. It has the following objectives:

1. to enable the pupils to read the 4-digit as well as 6-digit grid references;
2. to enable the pupils to recognise the basic conventional signs; and
3. to enable the pupils to differentiate between authoritarianism, democracy and laissez-faire, and to appreciate the value of democracy.

The lesson is built around a game called "Protect Your District". The pupils are given the role of a security officer who knows that a gang from outside will come and create trouble in his district. There are many strategic points he needs to protect, but he has only five squads to patrol the district. As a security officer, he has to decide where he should station his squads. A map of the district is given, and he has to locate on the map the five most important strategic points, give their 6-digit grid references and name the conventional signs. The game is played in groups operating under three different styles of leadership.

Teaching materials include a conventional textbook explanation of grid references, a student game instruction sheet (Figure 24.1), a large-scale wall-map with grids and conventional signs and a small-scale wall-map with longitudes and latitudes.

Teaching strategies include explaining, drilling, reading, gaming and discussing. The whole procedure, which requires about 65 minutes to complete, is given in some detail in Figure 24.2 in the form of a lesson plan. It may be noted that a double lesson lasts either 70 or 80 minutes in Hong Kong.

The implementation of the lesson

There are normally forty pupils in a class in Hong Kong secondary schools. For the present experimental lesson, they are seated in groups of five. It does not matter if one of the groups has a greater or smaller number of pupils.

PROTECT YOUR DISTRICT

RULES

1 The Security Officer knows that a gang from outside will come and create trouble in this district. He has only five squads. If you were the officer, where would you station the squads?

2 *Groups A1 and A2*: The leader of each group makes all the decisions by himself. Other members have no say at all.

Groups B1 and B2: The leader of each group works closely with the other members of the group. All decisions are made collectively.

Groups C1 and C2: There is no leader. Whoever seizes the opportunity (by raising his hand) first acts, and acts according to his own understanding of the situation.

3 There are altogether 15 rounds: Round 1, locate Station A on the map; Round 2, write the grid reference of A in the table; Round 3, name the conventional sign for A in the table; Round 5, location Station B on the map; etc.

4 For each correct answer, there is one mark. The highest possible score is 15, and the lowest, 0. If the scores are equal, the time counts.

GROUP NO.: .... Members: 1 .... 2 .... 3 .... 4 .... 5............

Answer

Code	Location (Grid Reference)	Object for protection
A		
B		
C		
D		
E		

Score: ....

Time: .... mins. .... sec.

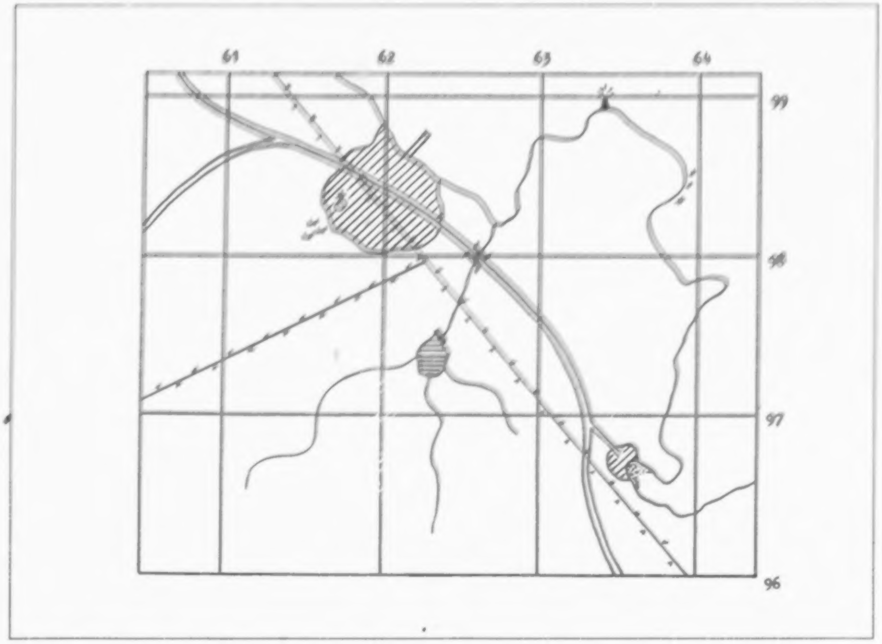


Figure 24.1 The student handout for the game "Protect Your District"

OBJECTIVE AND CONTENT	TIME (min.)	TEACHER ACTIVITY	PUPIL ACTIVITY	REMARK
Motivation 1 To arouse pupils' interest in maps and awareness of the need to master the skills of reading maps.	5	Talking; questioning	Listening; answering	Divide the pupils into six groups of five each: A1 A2 B1 B2 C1 C2; the rest act as referees.
Development: (a) conventional signs 2 To help pupils understand that conventional signs are map-readers' language; 3 To enable pupils to learn some basic conventional signs.	5	Talking; questioning	Listening; answering	
Development: (b) grid reference 4 To help pupils understand the function of grid reference; 5 To enable pupils to use 4-digit grid reference; 6 To enable pupils to use 6-digit grid reference.	10	Talking; questioning	Listening; answering	
Consolidation 7 To help pupils consolidate their knowledge of conventional signs and grid reference through (a) blackboard exercise and (b) silent reading	10	Questioning; observing	Answering; reading	Distribute reading material
Application 8 To stimulate pupils' interest in learning, to enhance their learning effects and to introduce to them the concepts of authoritarianism, democracy and laissez-faire through a competitive game played under three different styles of leadership.	20	Talking; observing	Listening; playing (referees observing)	Pupils to put away reading material; Teacher to distribute game's sheets (white for personal use; green for scoring); Pupils to hand in the green sheet once they have finished.
Conclusion 9 To help pupils clarify any doubts on conventional signs and grid reference by going over their answers; 10 To help pupils develop a favourable attitude towards democracy by discussing with them the pros and cons of the three different styles of leadership.				A questionnaire and a test to be administered after the lesson.

Figure 24.2 Lesson plan for playing the "Protect Your District" game

The lesson begins with the teacher emphasising the importance of maps and the need to master the skills of reading maps. He then introduces the pupils to conventional signs and demonstrates to them how a grid square is read and a point is located on a map using a grid reference. This is followed by about ten minutes of drilling, silent reading and further drilling, which are designed to help the pupils consolidate what they have learned so far. In the process, they are reminded that their efforts will be reflected in the game they are about to play.

It takes about five to ten minutes to explain clearly to the pupils how the game should be played. Only six groups actually participate in the competition, with two groups playing under one of the three different styles of leadership: authoritarian, democratic and laissez-faire. The rest of the class, about ten in number, act as observers and referees. Among them, two are specially assigned to the two groups under laissez-faire leadership.

In an authoritarian group, once the leader is elected, by whatever means they choose, the other members have no say at all throughout the competition. In a democratic group, the leader has to involve the other members in the decision-making process. In a laissez-faire group, there is no leadership at all: whoever seizes the opportunity first acts, and acts according to his own understanding of the situation.

The game is followed by a debriefing and concluding session. In this session, the teacher tries to help the pupils to clarify the concepts of authoritarianism, democracy and laissez-faire and to develop a favourable attitude towards democracy by questioning them and discussing with them their answers. The following are some of the questions to be asked:

1. For all competitors: "Did you enjoy the game?" (It is expected that more pupils from democratic groups than authoritarian or laissez-faire groups give positive answers.)
2. For authoritarian groups: "Were you the leader?" For laissez-faire groups: "How many answers, out of the fifteen, were contributed by you?" (It is expected that leaders and active participants enjoy the game more.)
3. For referees: "Which of the six groups do you think enjoyed the game most?" (It is expected that most of them point to one of the two democratic groups.)
4. For all pupils: "Why did some of you enjoy the game and some of you didn't? Is there any relationship with the style of leadership?"
5. For all pupils: "Which group do you think took the longest time to finish the game? And which group took the least?"
6. For all pupils: "Which group do you think has won the competition?"
7. For all pupils: "If you are in a position to decide on the style of leadership, which one would you choose?"

After the answers to the above and related questions have been fully discussed, the teacher helps the pupils to draw a few conclusions and brings the lesson to an end.

Evaluation

Observation by the teacher is one way of obtaining information for evaluation, but more objective data are also gathered by other means.

The pupils are asked to answer a questionnaire (Figures 24.3 and 24.4) and to complete a short test (Figure 24.5). These activities are conducted after a break of a few minutes or in the following geography lesson.

In a trial lesson conducted in June 1987, the author observed that the pupils were highly motivated and most of them participated actively in the lesson. The objective data collected showed that boys tended to find the game more interesting and get more involved in it than girls. Most of the pupils scored seven or more marks out of a total of ten in the test, nearly all of them said that they would choose a democratic style of leadership if they had a choice, but only a few of them demonstrated that they clearly understood the meaning of authoritarianism, democracy and laissez-faire.

In view of the fact that only forty pupils are involved in this lesson, the results are purposely expressed in very general terms. At a later stage, when more data are gathered as a result of this experimental lesson being repeated many times by practising teachers in schools, a statistical analysis will be conducted and a fuller report will be presented.

Conclusion

This study describes how civic education may be introduced in a seemingly value-free lesson on conventional signs and grid reference. The strategy adopted is to organize a competition for the pupils, in which different styles of leadership are employed. This provides an opportunity for the pupils to experience for themselves the advantages and disadvantages of authoritarianism, democracy and laissez-faire as styles of leadership and as social systems under which to live. It is hoped that through personal experience and guided discussion, pupils will understand these concepts more clearly and develop a more favourable attitude towards democracy.

As a teacher trainer, the writer has many opportunities to observe lessons on conventional signs and/or grid references. There appears to be a tendency for teachers to talk too much and pupils to do too little. As a result, the pupils are frequently bored and the teaching-learning outcome is often poor. The present strategy is developed to stimulate the pupils' interest. It is believe that they will learn better as a result (Carstensen, 1987). It would be interesting to compare the learning effects of this approach with those of the more traditional one.

Finally, it seems possible to adapt the present strategy to the teaching of other topics. To this end, further studies and experimentations are required.

1 Group: ....

2 Sex: male: .... female: ....

3 Did you find the game interesting?

interesting 5 4 3 2 1 uninteresting

4 How did you behave during the game?

attentive 5 4 3 2 1 inattentive

5 How did you feel during the game?

interested 5 4 3 2 1 bored

6 Were you satisfied with the leadership of your group?

satisfied 5 4 3 2 1 dissatisfied

7 **To be answered by members of Groups A1, A2, B1 and B2**

Were you the leader of your group? yes: .... no: ....

To be answered by members of Groups C1 and C2

Of the 15 answers, how many were contributed by you? ....

8 There are three different styles of leadership, namely laissez-faire, authoritarian and democratic. Which style did the following groups adopt?

A1 and A2: .... B1 and B2: .... C1 and C2: ....

9 After this lesson, do you have a better understanding of the three different styles of leadership?

Yes 5 4 3 2 1 No

10 If you are in a position to decide on the style of leadership, which one would you choose?

laissez-faire: .... authoritarian: .... democratic: ....

Figure 24.3 Evaluation questionnaire for competitors

1 Sex: male: .... female: ....

2 Did you find the game interesting?

interesting	5 4 3 2 1	uninteresting

3 How did the members of various groups behave during the game?

A1 and A2	attentive	5 4 3 2 1	inattentive
B1 and B2	attentive	5 4 3 2 1	inattentive
C1 and C2	attentive	5 4 3 2 1	inattentive

5 Were the members of various groups satisfied with the leadership of their group?

A1 and A2	satisfied	5 4 3 2 1	bored
B1 and B2	satisfied	5 4 3 2 1	bored
C1 and C2	satisfied	5 4 3 2 1	bored

6 There are three different styles of leadership, namely laissez-faire, authoritarian and democratic. Which style did the following groups adopt?

A1 and A2: ....
B1 and B2: ....
C1 and C2: ....

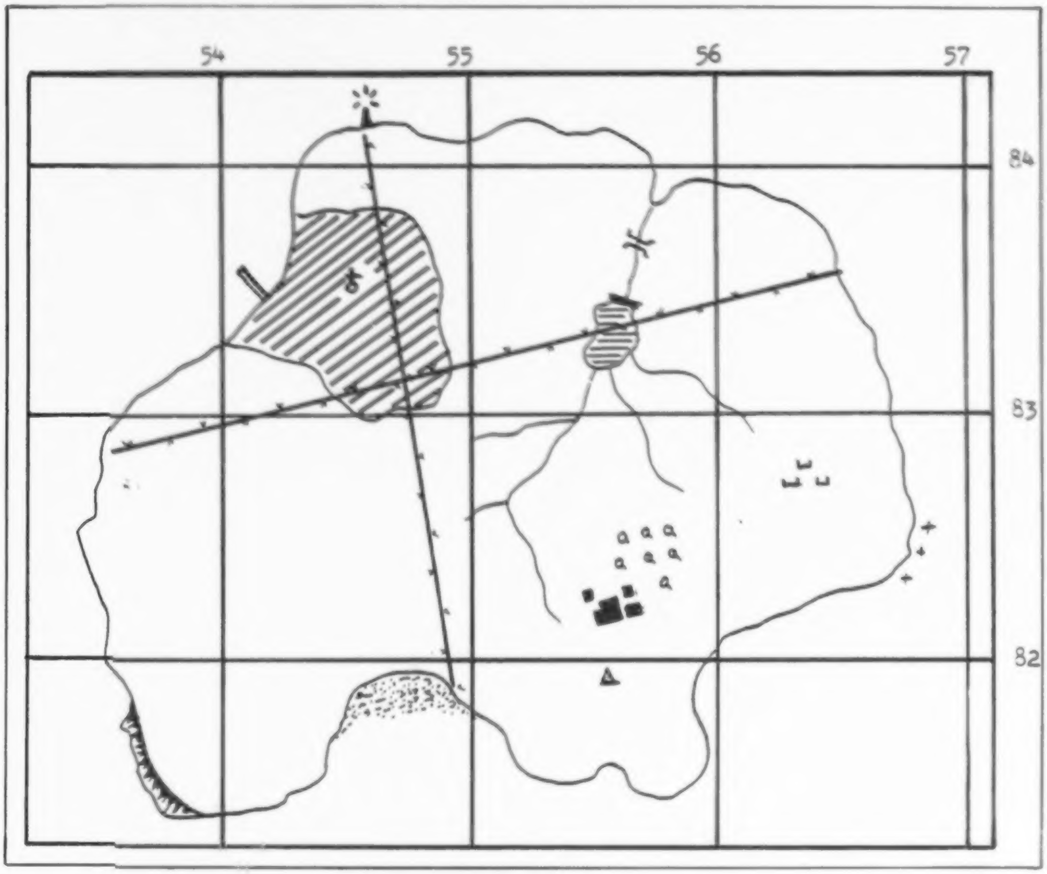
7 After this lesson, do you have a better understanding of the three different styles of leadership?

yes	5 4 3 2 1	no

8 If your are in a position to decide on the style of leadersip, which one would you choose?

laissez-faire: ....
authoritarian: ....
democratic: ....

Figure 24.4 Evaluation questionnaire for referees



1 Give the 4-digit reference for the following features:

(a) Reservoir ....

(b) Beach ....

(c) Cemetery ....

(d) Awash and submerged rocks ....

(e) Pier ....

2 Give the 6 digit reference for the following features:

(a) Bridge ....

(b) Church ....

(c) Lighthouse ....

(d) Where the river enters the sea ....

(e) Where the two power lines intersect ....

Figure 24.5 The short test on grid references

REFERENCES

Carstensen, L.W. (1987) "Teaching map reading through a tournament", *Journal of Geography*, 86(1), 30-31.

Chorley, R.J. and Haggett, P. (eds.) (1965) *Frontiers in Geographical Teaching*, London, Methuen.

Education Department (1985) *Guidelines on Civic Education in Schools*, Hong Kong Government.

Fenton, E. (1966) *Teaching the New Social Studies in Secondary Schools*, New York, Holt, Rinehart and Winston.

Graves, N.J. (1984) *Geography in Education* (Third Edition), London, Heinemann.

Hart, C. (1982) *Values Enquiry in Practice*, University of London Institute of Education, Schools Council Geography 16-19 Curriculum Development Occasional Paper No. 3.

Lawton, D. and Dufour, B. (1973) *The New Social Studies*, London, Heinemann.

Metcalf, L.E. (ed.) (1971) *Values Education: Rationale, Strategies, and Process* (41st Yearbook of the National Council for the Social Studies), Washington D.C., National Council for the Social Studies.

Raths, L., Harmin, M. and Simon, S. (1966) *Values and Teaching*, New York, Merrill.

Secretariat (1984) *White Paper: The Further Development of Representative Government in Hong Kong*, Hong Kong Government.

Wiegand, P. (1986) "Values in geographical education", in Tomlinson, P. and Quinton, M. (eds.) *Values Across the Curriculum*, London, Falmer, 51-76.

25: ROLEPLAY IN GEOGRAPHICAL EDUCATION: A CASE STUDY OF CITY TRAFFIC

Hartwig Haubrich

After two decades of experiences with roleplay, I am sure that its use in geography teaching can make students happy and can show them how useful geographical knowledge and skills can be in real life situations.

Roleplay - definition and methods

Roleplay offers an opportunity to simulate the behaviour of different individuals and groups in a social context - geographical roleplay in a social-spatial context. The starting point is a problem to be solved, the central part is the communication between different interest groups and the result is a decision, in a geographical context, about the solution of a spatial problem.

There are different roleplay methods:

1. The conference method allows the roleplayers to discuss a problem freely, but without resource materials being available.
2. The case method requires the roleplayers to use given resource materials such as statistics, maps and text information to enact their roles.
3. The event method requires the roleplayers to undertake their own survey to find adequate information for their discussion and decisions.
4. The project method asks the roleplayers to solve a practical problem.

The roleplay "City Traffic" is characterized by an approach that uses elements of each of the above methods: from the conference method, the players discuss a problem freely; from the case method, they receive some information; from the event method, they can look for further material about traffic in their own city; and from the project method they develop their own city plan, e.g. to implement a pedestrian area and therefore draw maps, build models or write newspaper articles to publish their ideas. To get a feeling for the different interest groups the players receive some role information, but they can play their role as they wish and they can use their expertise and other materials to make the most suitable decisions.

The aims of roleplay

Geographical roleplay enables students:

1. to analyze social-spatial processes,
2. to evaluate the varied interests of different social groups in spatial issues,
3. to explain environmental problems,
4. to develop models and strategies for implementing a humane environment,
5. to use geographic and other interdisciplinary information for the above task,
6. to practise adequate discussion and participation techniques,
7. to exercise the right and to accept the duty of participating in social spatial decision processes.

As one can see, geographical roleplay has the function of improving the social, communicative, political and geographical competence of students and of accentuating social and affective components of education such as social and verbal interaction, empathy for the feelings and interests of other groups and the emancipation of oppressed people.

Goals of the "City Traffic" game

The "City Traffic" Game has the following special goals:

1. to describe the structure and functions of a city,
2. to analyze the impact of the traffic on the city,
3. to articulate the wishes of different interest groups to change the city traffic,
4. to develop plans and strategies to implement a more humane city life,
5. to find information in maps, statistics, reports, newspaper articles etc.,
6. to advance arguments using this information within the discussion,
7. to revise standpoints if necessary,
8. to compare a city traffic model with a self developed plan,

9. to respect the wishes of other interest groups and be ready to agree to social, just and humane solutions.

These special goals are combined with the following pedagogical functions:

1. to avoid the lack of real decisions in traditional lessons,
2. to substitute learning by doing instead of factual presentation in teaching,
3. to motivate students through the freedom of the game and existential contact with reality,
4. to provoke spontaneity, engagement and fantasy,
5. to develop creativity, emancipation, socialisation and participation in decision-making processes.

The process structure of roleplays

1. Basic Processes

Although the process structure of roleplay should remain open and changeable and, therefore, in the hands of the roleplayers and not in those of the teacher, the following sequences are to be observed (See Figure 25.1).

1	preparation phase	chair: teacher classwork: students problem and procedure clarification role distribution
2	information phase	group leader group work pedestrians buyers tourists car drivers shopkeepers residents user of public traffic systems traffic experts information analysis role identification solution and strategy finding
3	decision phase	chair: mayor (roleplayer not teacher) plenary session of a citizens initiative statements, debate, decision by vote
4	analysis phase	chair: teacher classwork: students' analysis of subject competence, interactions, strategies and decision
5	comparison	visit to a pedestrian area, city planning office or a similar institution in order to compare the in-school decision with the reality

Figure 25.1 The process structure of the role play: "City Traffic"

During the preparation phase:

a) the problem and situation must be explained,

b) the game rules have to be agreed upon,

c) the roles have to be distributed either according to the wishes or to the abilities of the students or by chance.

Usually the group discussions take place during the first phase of the game. This phase has the function of studying the role interests, of analysing or finding information, developing models and goals, and designing strategies to implement the proposed plan.

The second game phase is built on the discussion of the entire group. The statements of the different interest groups, the presentation of the models and goals and the debate about the proposals lead to a final decision, i.e. to a vote about the application. The first and second phase can be repeated as often as necessary.

After the end of the game there follows a critique which has the function of analysing and evaluating interaction, knowledge skills, social skills and norms which influenced the decision. The behaviour of the roleplayer and not the behaviour of the student as student is subject of the analysis.

Special importance is attached to the final comparison of the decision with reality in order to maintain a balance between realistic and utopian views of our world.

2. The sequencing of the roleplay "City Traffic"

After having looked at a current traffic accident or having studied the traffic problems in their home city, the students are given the opportunity to assume the roles of interest groups and influence a public discussion in order to improve the traffic situation according to the various interests represented in the roles. Therefore, the roles are first determined and distributed. Then an agreement about the procedure follows, i.e. about the chair for the discussion, the speakers' list, the record of the discussion, the kind of vote and the decision-making process. The different interest groups meet individually, develop their own plan, look for information and arguments for their plan, discuss strategies and choose a group speaker.

After the group discussions, the plenary session is held. Each group presents its statement, with illustrations, if necessary. Then the debate starts and at the end the chairman calls for a vote on the different proposals to improve the city traffic. After the end of the roleplay the students analyse the behaviour of the different roleplayers and the outcome of the simulation.

The comparison of the decision with the reality can be done by a visit to a pedestrian area, a meeting with a city planner or a similar activity.

The communication structures of roleplay

1. Basic communication structures

The limits of school lessons do not normally allow for a large number of interest groups because there is not enough time for numerous statements and discussions. Therefore 3 to 6 students may adopt the same role. The students should have enough time to study their role and subject information and, most importantly, to identify with the role. During a roleplay one finds different communication structures:

a) individual study of the subject material,

b) group interaction to find an agreement about the proposal, the arguments and the strategies for the final decision-making process, meetings of two or three groups to build coalitions,

c) hearings or meetings of all groups to simulate a citizens initiative, a city council or similar decision-making body.

Just as in the case of the process structure, the communication structure also should be basically alterable by the roleplayers.

2. The communication structure of the "City Traffic" game

The students simulate the following or other roles: pedestrians, users of buses and trams, car drivers, shopkeepers, buyers, tourists, city residents, traffic experts.

These roleplayers look for their own information but can also use role and subject information from handouts the teacher has prepared. It is better when they find their own resources. Those who play pedestrians, for example, use material about traffic noise, emissions and road accidents. The traffic experts can use information about park and ride systems, new taxis, rapid transit, underground, tram and other systems, electric cars, separation of public traffic, individual car traffic, bicycles, parking and pedestrians at different levels or in different zones.

The shopkeepers read in their role information something about uncertain estimates about the increase or decrease of the number of buyers when a pedestrian area forbids drivers to park directly beside the different shops, etc.

Experiences with the "City Traffic" Game showed the following forms of interactions during the different phases:

a) transformation of information into argumentation,

b) transformation of information into goals, models and solutions,

c) coalitions with other groups,

d) identification with role interests,

e) empathy for other interest groups,

f) revision of policy positions,

g) emancipation, i.e. votes of minorities,

h) conflict solving techniques,

i) offensive and defensive strategies,

j) effective visualisation and verbalisation.

All these social and verbal interactions or communication forms can be analysed in the course of geographical games in order that students may see how useful geographical information can be for real life and how geographic knowledge must be transformed into arguments in a social context if it is to help us understand and improve real life in our current environment.

The information structure of roleplay

1. Basic information structures

The students receive the information about the problem and situation and some hints about possible procedures during the preparation phase.

The information about the role behaviour - if there is one - and the information about the context of the problem and the models of solutions are studied during the first phase of the roleplay as individuals or in small groups. If the teacher wants to stress social geographical features he/she should include socio-biographic information, i.e. describe the roles precisely in order to provoke a discussion about completely different interests. Of course, every roleplay needs subject information - either offered by the teacher or found by the roleplayers themselves. This last possibility helps the student better to prepare for real life situations. It depends on the play's intentions whether the information is distributed equally to the roleplayers or unequally according to the group structures and interests. Unequal distribution of information accords with the real life situation and normally produces more lively group dynamic processes.

The subject information can be reduced to a description of the current situation. Then players have to find their own solution for the problem, but it is also useful to offer some hints of alternative solutions. Then the roleplayers have to select or combine the different models. Very often, it is too difficult for students to find a completely new solution. The amount of information is dependent on the structure of the problemsituation and on the ability of the roleplayers to understand the given information. Roleplays are principally open systems in which the amount and the structure of the information is open. Since there can be no optimal amount of information it is not necessary for all roles and groups to possess the same information. This mirrors real life situations. At the moment of decision the information level is only as good as the knowledge level of the role players.

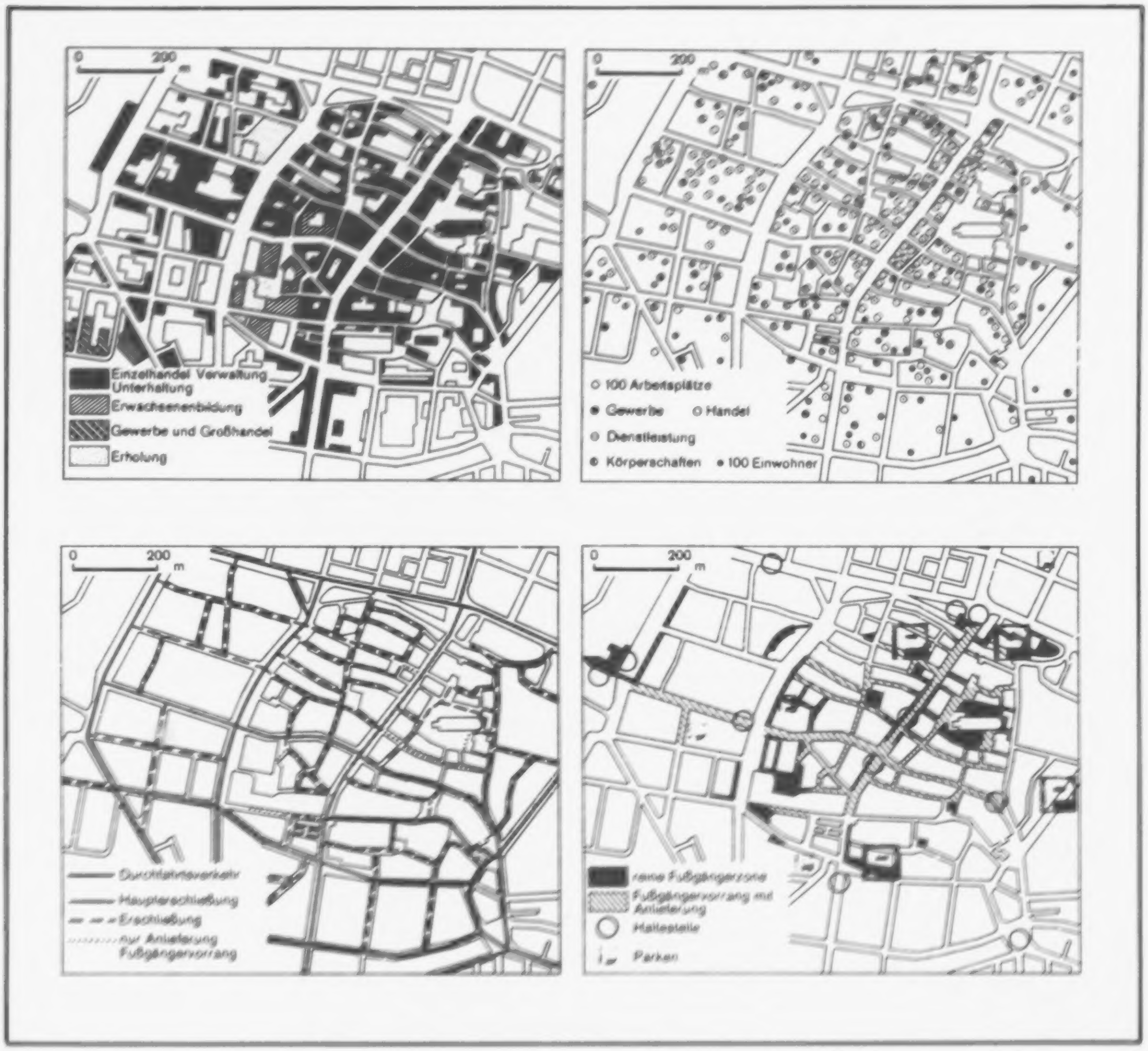


Figure 25.2 Some maps of Freiburg C.B.D.from the "City Traffic" package

top left:	Land use	top right:	Work places
bottom left:	Street system	bottom right:	Pedestrian areas

2. Information structure of the "City Traffic" game

Figures 25.2 shows some of the illustrations from the information packet which accompanies the roleplay "City Traffic".

The roleplayers of the "City Traffic" game showed the following subject competence and spatial understanding as it was observed in one playing session. There were many long verbal interactions which revealed the students' ability to analyse spatial structures and to understand spatial processes. The solutions and models corresponded to the interests of the different groups. The nature of the city was discussed in the following contexts:

a) as a shopping centre,
b) as a recreation area,
c) as a traffic centre,
d) as an architectural monument,
e) as a pedestrian paradise,
f) as a housing area, and
g) as a communication centre for the urban citizens.

Evaluation of the roleplay

Progress in knowledge received through roleplays, improved use of techniques and subject skills and the perception of social or group dynamic processes can all be tested by written and oral tests. But these games should not be affected by traditional and not-so-popular, teaching methods. A very useful means for evaluating roleplays is via the use of a video-recorder to capture all of the visual, oral and physical interactions that occur during their implementation. Positive results from playing roleplays found in this way were: improvement in knowledge, technical and social skills and behaviour and, best of all, happy students.

REFERENCES

Haubrich, H. (1983) *Konkrete Didaktik der Geographie*, Munich, Oldenbourg Verlag.

Haubrich, H. (1978) *Westermann Planspiel-Theorie und Einsatz*, Braunschweig, Westermann Verlag. (This publication contains a bibliography on rolegames, the description of 9 geographic rolegames and the theory and practice of rolegames in Geography.)

26: CRITICAL SKILLS IN GEOGRAPHY TEACHING

Rob Gilbert

The idea of critical skills in this title has two possible interpretations The first connects with the long tradition of research and development in education based on the concept of critical thinking. The second points to recent developments in education which highlight the need for social criticism and ideological critique. Both are important in geography teaching, and both call for a set of critical skills which, while not sufficient to achieve the aims of critical teaching, are necessary elements when used in tandem.

Critical teaching and logical analysis

Here the emphasis is on teaching students to assess the validity of statements from a set of specified criteria drawn mainly from the tenets of logic (Ennis, 1962; D'Angelo, 1971). They include the need to be clear in argument, to recognise assumptions, to draw valid inferences and conclusions, and to avoid a number of common fallacies such as those of extension, *ad hominem* argument and the like. The usual strategy for this approach is to establish as an accepted and constant part of classroom activity the demand for critical standards of discussion. The aim is that these standards become accepted as rules governing interactions not only between teacher and students, but also among students themselves, and in any written tasks. The following questions are typical of the criteria which should govern interactions. The questions are grouped to reflect the major elements of critical thinking, and to illustrate the kinds of demands which all participants in the classroom might make of themselves and others.

1. Semantic clarity.

What do you mean when you use the word...?
Can you give examples of what you mean?
Does your use of that term include...?
What is the effect of...(emotive word)...in this passage?
How is the meaning affected if we substitute...?
Did you mean to imply that...?

2. Focusing and explaining the issue.

What is the source of this disagreement?
How can we decide which argument is stronger?
What proof would you need to be convinced of the truth of that statement?
What information do we need to answer that question?

3. Logical conclusion.

Is that the only possible conclusion?
Do we have sufficient evidence for that generalisation?
How confident are you that that is so?
Is that always the case?
On what principle do you base that statement?
Are there any examples which might contradict that statement?
How did you arrive at that conclusion?
How do you account for the exception?
Are there differences between these two things that might prevent us from applying a statement about one to the other?
What could happen to prevent the fulfilment of your prediction?
Does that necessarily follow?
Is that a probable or merely a possible outcome?
Under what conditions is that likely to happen?
Which statement best explains all the data we have observed?

4. Consistency in argument.

Does that statement support or contradict what you said earlier?
Is that a true example of what we are discussing?
Are you sure the author is saying what you think she is saying?
Does that statement fall within our definition of the problem?

5. Evaluation of evidence or authority.

Does this evidence prove this statement true? Could some other statement explain this evidence?
How is this author qualified to make that statement?
Do all authorities agree on that point?
What evidence does this person have for saying that?
Does the statement reveal any prejudice which might affect the validity of the conclusion?
Do we have sufficient evidence of this? What further evidence do we need?

These standards are important and it is difficult to imagine how a genuine education could occur without them. However, they are only one way in which critical teaching can be construed, and they can overlook other standards of thought and discussion which should be part of our concept of education. Their deficiency lies in the focus on rational process to the exclusion of considerations of justice and human interest. The critical thinking tradition emphasises the process of rational argument and conclusion from given premises. It does not contain criteria by which we can judge the significance of these premises, whose interest is served by the inquiry, whether the problems are themselves important, and to whom, or what would count as a satisfactory solution in the broader and not merely logical sense.

Critical teaching and ideological critique

Such issues raise a different concept of critical skills in geography teaching, and connect with recent developments in critical teaching rather than critical thinking (Shor, 1980). In the work of Kemmis, Cole and Suggett, the critical approach to teaching involves experience in critical reflection, social negotiation and the organisation of action. Education must develop the power of constructively critical thinking, not just in individuals but also in group processes. The substance of education, according to this orientation, must emphasise social and critically-reflective processes, not only what history has thrown up as worth knowing. Indeed, much of what history bequeaths us is a product of irrational and unjust processes, and it must be understood and criticised as such. (Kemmis, Cole and Suggett, 1986)

If we apply these ideas to geography teaching we can see a direct connection with a number of recent developments in curricular discussion, for geography educators are increasingly recognising that our curricula have not in the past been critical in this sense. The result has been that certain perspectives have been ignored, important questions left unasked, and valuable learning foregone. In the areas of race, class and gender we have seen that geography teaching has been narrow and exclusive of the proper interests of less powerful groups (Fien and Gerber, 1986; Gilbert, 1984; Huckle, 1983).

All geographical texts present a selection of descriptions, interpretations and explanations of what it is thought important to know. This selection will reflect certain identifiable priorities and perspectives, and recognising these is the first step in a critical approach to geography teaching. The following list suggests the kinds of questions we might ask of the material we teach in order to develop such a critical attitude (Gilbert, 1986).

1. What propositions, generalisations and broad concepts provide the organising structure of the discourse?

These are the basic elements of geographical content - the topics, key concepts and propositions around which texts are organised. Emphases on physical rather than human, local rather than international, spatial rather than environmental topics indicate judgments about what is most important in geography and how this is best understood. To give a more specific example, to include the particular perspectives of women or ethnic groups in geography, we would need to introduce topics which may not seem important from a white anglo-saxon male view. All such decisions need to be made from a socially critical as well as a logically critical perspective.

2. How do concepts, terms, metaphors, jargon and other stylistic devices elaborate these basic elements?

Ideas take on different meanings as they are expressed in different ways, and the words we use to describe and explain will reflect the perspectives from which we view things. For instance, the decision to refer to workers as "labour" can have dehumanising overtones, just as "manpower" has sexist ones. And yet in geographical explanation the desire for so-called scientific explanations can easily (if unintentionally) produce such ideological effects. Take the following example from one geography book:

"Workers, machinery, and power are taken to those places where natural resources are available; and the permanence of the location is determined by the continuance of such conditions as a favourable climate and the abundance and quality of raw materials." (Stone, 1972)

To refer to people in such a way, and to exclude their welfare from considerations of industrial location is to deny them any role in such decisions, and to justify this exclusion by presenting them as just another (and in this case not very important) factor of production.

3. What are the underlying problems which have generated this discourse? How has the text articulated these problems? From whose perspective? In whose terms?

Geography books will be designed around some set of problems which are thought important. Even straightforward descriptive statements can be seen as answering certain questions and not others. Traditionally, geography has focussed on spatial variation in natural environments and how their resources have been used by people to earn their livings. But this has led to an overemphasis on physical rather than social geography, and the neglect of a wide range of aspects of human experience. For instance, political geography has been neglected in this traditional focus, and yet is clearly very amenable to geographical study. Further, in technologically developed societies this imbalance has meant a focus on extractive, primary and secondary industry at the expense of the kinds of work performed by the great majority of people. Another example, as Monk and Williamson-Fien (1986) have shown, is the way in which problems are portrayed from a male perspective to the detriment of an understanding of the place of women. In these and other ways geography speaks from particular perspectives, and only by asking whose problems it is addressing can we prevent the interests of certain groups being ignored.

4. What theories provide the descriptions and explanations thought relevant? What relationships, causes, consequences are proposed? On what premises is the account based and what assumptions are made in the course of the explanation?

Theories articulate problems and related ideas in order to make sense of the world. As has been shown above, they will always be selective in what they try to explain and how they explain it. As a result, they will close off certain questions and conclusions. Environmentally deterministic explanations ignore the constructive (and destructive) role of culture in the way people relate to environments (Berry, 1978). Explanations based on spatial models overlook the political and economic systems through which the spatial economy is given its effect (Lee, 1977).

5. What perspectives, questions, theories are not acknowledged?

In studying the world we need to recognise the selectiveness of descriptions and explanations, to ask whose perspective is being recognised. Ethnocentric, national and sexist bias occur in large degree because the questions which guide our study are framed from the perspective of a dominant culture. How often in our study of other countries do we ask how their inhabitants would perceive the problems we discuss? And when we do, how often do we genuinely seek their views through their own media or spokespeople, as opposed to our own media channels or our own attempts at imaginative empathy, both sources themselves restricted by ethnocentrism? To take the example of sexism once more, Monk and Williamson-Fien (1986) would have us ask in any geographical study where the women are. If such procedures became a regular part of geographical enquiry, the perspectives of others would be more often recognised and the ideological exclusion of the legitimate interests of the less powerful would be reduced.

Conclusion

It is clear that critical teaching in geography will involve both forms of critical thinking - one based on rules of logical procedure, the other on principles of social significance. The combination is shown well by Kemmis when he illustrates the implications of the notion of the socially-critical school:

> "How then might we approach the teaching of a 'subject' like geography in the socially critical school?...It would start by raising the question of how the knowledge we call 'geographical knowledge' contributes to increased rationality (in our use of language to communicate), greater social justice (in the forms of decision-making we adopt which reveal how power is exercised), and more interesting and satisfying forms of life for all (in our forms of work, demonstrating how human and social action and interaction is (sic) arranged to meet our material needs and to express our creative and constructive capacities)?" (Kemmis, 1986: 22)

This last aspect of Kemmis is especially important, for without it, critical teaching as described here can become backward looking and negative, constantly assessing the statements of others, but unable to propose solutions. Only by addressing the important issues of the present and their possible future solutions can critical teaching be truly productive. It is for this reason that critical teaching cannot be reduced to skills of the kind listed above, however important is the part they play. Ultimately, questions of welfare, justice and human interest cannot be identified and resolved by applying a set of specified skills, but only by practical, ethical and political judgment.

REFERENCES

Berry, B. (1978) "Geographical theories of social change", in Berry, B. (ed.) *The Nature of Change in Geographical Ideas*, DeKalb, Illinois, Northern Illinois Press.

D'Angelo, E. (1971) *The Teaching of Critical Thinking*, Amsterdam, B. R. Gruner.

Ennis, R. (1962) "A concept of critical thinking", Harvard *Educational Review*, 32(1), 83-111.

Fien, J. and Gerber, R. (eds.) (1986) *Teaching Geography For a Better World*, Brisbane, Australian Geography Teachers' Association with Jacaranda Wiley.

Gilbert, R. (1984) *The Impotent Image: Reflections of Ideology in the Secondary School Curriculum*, Lewes, Sussex, Falmer Press.

Gilbert, R. (1986) 'That's where they have to go': The challenge of ideology in geography", *Geographical Education*, 5(2), 43-46.

Huckle, J. (ed.) (1983) *Geographical education: Reflection and Action*, Oxford, Oxford University Press.

Kemmis, S., Cole, P. and Suggett, D. (1986) *Orientations to Curriculum and Transition: Towards the Socially-critical School*, Melbourne, Victorian Institute of Secondary Education.

Lee, R. (1977) "Anti-space: Geography as a study of social process writ large", in Lee, R. (ed.) *Change and tradition: Geography's New Frontiers*, London: Department of Geography, Queen Mary College, University of London.

Monk, J. and Williamson-Fien, J. (1986) "Stereoscopic visions: Perspectives on gender - challenges for the classroom", in Fien, J. and Gerber, R. (eds.) *Teaching Geography for a Better World*, Brisbane: Australian Geography Teachers' Association and Jacaranda Wiley.

Shor, I. (1980) *Critical Teaching and Everyday Life*, Boston, South End Press.

Stone, W. (1972) *Geographic Fundamentals*, London, Heinemann Educational.

27: GEOGRAPHY, DECISION-MAKING AND SOCIO-ECONOMIC DEVELOPMENT ISSUES IN ZAMBIA

Fashion Phiri

This paper discusses examples of the geography lessons and decision-making exercises related to Zambia's socio-economic development issues. The paper is based on the recent study of the writer (Phiri, 1987). In this study, four value-laden geography units suitable for Grades 10-12 (i.e. senior secondary grades) were developed and evaluated in Zambian secondary schools. The units were related to rural - urban migration, foreign aid, regional cooperation and wildlife. Each unit consisted of three lessons which were expected to be taught within 40-80 minutes. The aim of the paper is to present two lessons and exercises, the outcome and the possible implications of such lessons and exercises to matters of development in Zambia.

The background of the paper relates to the assumption that the units and lessons which could reinforce a match or congruency with Zambia's socio-economic development aspirations are likely to contribute to the development of Zambia. The contention is that if value-laden strategies are able to generate learning outcomes such as decision-making, political literacy and values and attitudes awareness and understanding, they are likely to promote critical understanding of socio-economic development issues. It is suggested that knowledge which includes critical understanding and involves questioning issues of society is a pre-requisite to developing Zambia socially, economically and politically. Writers such as Slater (1982), Huckle (1983), Gilbert (1984) and Naish *et al.* (1987) implicitly or explicitly suggest that practice in decision-making contains elements of political literacy and awareness of values and attitudes and is likely to lead to a deeper and more critical understanding of relevant issues.

Summary of the content of the units.

Unit 1: "The wisdom of the 'Go back to the land' campaign"

The emphasis of this unit is on the rural - urban migration in Zambia. Rural-urban migration is of great interest to geographers. In Zambia, this process has partly hampered socio-economic development in the sense that rural areas are short of able-bodied workers while at the same time, the growth of population in urban areas through migration has created shortages of essential amenities such as housing. The "Go back to the land campaign" launched by the Zambian government is seen to be one of the methods for encouraging people to go back to the land in order to promote development.

The unit therefore aims to help students develop and become aware of values, attitudes, decision-making and elements of political literacy by encouraging them to clarify and question their values and attitudes and those of the other social groups on matters of rural - urban migration.

The study utilises value-laden strategies that help students to express their preferences, decisions, actions and attitudes towards the issue.

Unit 2: "The idea of relying on foreign aid for socio-economic development"

This unit focusses on the idea of development of Zambia through foreign aid. Geographers are interested in finding out the distribution of foreign aid and its impact on development of a given country. They are also interested in the interrelationship between developed and developing countries through foreign aid.

The unit aims to help students understand the impact of foreign aid on Zambia's development effort. It helps to expose the myths that "the greater the flow of foreign aid to Zambia, the more likely it is to be developed". Further, it helps to highlight the unequal interrelationship between donors and recipients of foreign aid which to some extent promotes underdevelopment instead of development.

Value-laden strategies are used to help students understand the complexity and the impact of foreign aid on Zambia. In the process, it is hoped that students could develop certain values, attitudes and political literacy through the understanding of the impact of foreign aid on socio-economic and political issues of Zambia. For example, spatial injustice between developed and developing countries is clearly evident through the study of foreign aid to Zambia. It is hoped that such a unit would enlighten students about the impact of foreign aid and help take the necessary actions to reduce the problems that arise should they be given a chance.

Unit 1 implies that if Zambia is to develop, one of the methods is to encourage people to go back to the land. It also implies that education through value-laden geographical education could play a role by encouraging students to acquire worthwhile knowledge and understanding about the issue which includes changing and or developing values, attitudes and decision-making.

Assuming that the content of Unit 1 is taught through value-laden strategies, evaluation of the unit should involve assessing the value judgments and the decisions that students may have made. If the unit helps students to gain a critical understanding of the issue through expressing preferences, decisions and possible actions that may help resolve the issue, then the expected learning outcomes may be regarded as having taken place.

Similarly, Unit 2 involves the issue of foreign aid as tool for developing or underdeveloping Zambia. If such a unit is taught, it may be assumed that the students may gain an understanding and awareness of the impact of foreign aid on the development of Zambia.

Summary of selected lessons

Figure 27.1 is a summary of the second lesson of the 'Go back to the land campaign' unit while Figure 27.2 summarises the third lesson of the foreign aid unit.

The aim of the lesson described in Figure 27.1 is to encourage students to evaluate the likely consequences if the campaign is not implemented.

The first task for the students is to answer the questions based on their life experiences. Students are expected to choose from among the five statements that suggest what is likely to happen if the campaign is not implemented in the near future.

The next stage involves students in studying resources in order to support or oppose their choices. Then they are asked to state their final choices after taking into account group comments.

The final stage requires students to propose the possible actions that they would take in real life situations on the issue of the campaign.

It is suggested that the lesson is likely to reveal values and attitudes that they hold over the "Go Back to the Land" campaign and the rural areas.

Figure 27.2 represents a lesson that emphasizes the possibility and reliability of foreign aid in promoting and implementing the desirable form of development in Zambia and other developing countries. In addition, the lesson aims to assess what needs to be done over the issue of foreign aid and development.

The first stage of the lesson requires students to study the resources in order to assess the possibility and reliability of foreign aid in the process of socio-economic development. The second stage involves evaluation of the resources in order to assess the possible solutions and actions needed to resolve the problems associated with foreign aid. Finally, students are encouraged to weigh the evidence and propose solutions and actions to resolve the problems of foreign aid.

The contention is that this lesson is likely to encourage students to make decisions regarding what they consider to be the best solutions to the foreign aid and development issue. The lesson is also likely to encourage a broader and deeper understanding of foreign aid and its impact on development in Zambia and elsewhere in Third World countries.

The decision-making exercises and examples of students' responses.

Figure 27.3 is a simple decision-making exercise designed to assess the students' preferences between urban and rural life. The responses of selected respondents are also shown. From the responses in Figure 27.3, it is clear that the unit and the exercise assessed students' preferences for urban and rural areas. Since the exercises were given after the unit had been taught, the results show two important elements, one a potential benefit and the other partly a potential and partly an actual outcome. First, some students may have changed their views about the rural areas as a result of studying the unit, though we cannot know in this case since a pre-questionnaire was not administered. Secondly, the exercise, and by implication, the unit probably encouraged the students to develop a critical understanding of the issue though again we do not know what reasons they would have given before the unit was taught.

Similarly, Figure 27.4 is a decision-making exercise on the foreign aid unit and shows a verbatim response of one of the students. The response to the question indicates that the unit activated and/or reinforced and developed an awareness and understanding of the Foreign Aid issue since the arguments appear to be valid.

Conclusion

This short paper has attempted to show how the lessons and the decision-making exercises related to rural-urban migration and foreign aid to Zambia may encourage students' understanding and awareness of values, attitudes, decision-making and political literacy which may prove to be congruent with Zambia's desired socio-economic development aspirations. If this is so, then students' experiences in their geography lessons may contribute to the development of their country.

1 Topic: What consequences are likely to occur if the campaign is not implemented to a certain degree in the near future?

2 Objectives: Students should be able to express their views, opinions as well as predict what is likely to happen if the campaign is not implemented to a certain degree in the near future.

3 Teaching Strategies: Modified values clarification. (The emphasis of this strategy include encouraging students to choose, prize and act.)

4 Lesson Development
Answer the questions below after considering your life experiences.

- What is likely to happen if the campaign is not implemented in the near future?

  Choose from among the following statements to answer the above question:

  - nothing will happen
  - urban areas will benefit more than rural areas
  - rural areas will benefit more than urban areas
  - both rural and urban areas will benefit
  - both rural and urban areas will not benefit

- Give reasons for your choice.

Answer the questions below after studying the resources (students divided into groups. Each group is to study at least one of the resources provided.)

Resource 1: (Rural-urban migration circle — cartoon)

- Study the cartoon, taking note of the desirable or uindesirable impact of the migration circle on rural and urban areas. Does the resource support your first choice.

Resource 2: (A Phiri Anabwela (Mr Phiri came) — a song)

- What are some of the undesirable effects of rural-urban migration depicted in the song?

- Does the resource support your first choice?

Resource 3: (Dear Matilda, Please come home . . . a letter based on fiction and facts)

- Read the letter, paying particular attention to the disadvantages of urban areas as perceived by Matilda's parents. State also some disadvantages or rural areas mentioned. Does the resource support you first choice?

Resource 4: (Chonas (i.e. long term immigrants) on the Copperbelt — letter)

- Read the letter, taking note of the decisions of some of the long term immigrants to remain permanently in towns. Note the fate of some of the immigrants. Does the resource support your first choice?

Resource 5: (Persons seeking employment — statistics)

- Study the statistics reflecting the number of people seeking employment in urban areas in particular. Note that since 1970, the number of the recorded unemployed has remained high, thus reflecting the failures of urban areas to absorb the labour force. Predict the state of unemployment in the near future. Does the resource support your first choice?

Answer the questions below after responding to the questions above as well as life experiences and comments from other groups.

- What is your final choice?
- Did you change your original position? Give reasons.
- What actual actions would you take in the real life situation if what is likely to happen as indicated in your final choice is very negative to the overall development of the country?

Figure 27.1 A summary of the second lesson of the teaching unit on the "Go Back to the Land" campaign

1 Topic: How possible and reliable is foreign aid in promoting and implementing 'ideal' forms of development in Zambia and other developing countries? And what needs to be done?

2 Objectives: Students should be able to express their views, opinions and feelings as regards to the degree of possibility and reliability of foreign aid in promoting and implementing the 'ideal' form of development in Zambia and other developing countries: propose solutions and possible actions to remedy the situation.

3 Teaching Strategies: Values analysis in brief (The emphasis of this strategy includes encouraging students to make value judgements — rating items in respect to their worth.)

4 Lesson Development
Answer the questions below after studying the stated resources. (Students divided into groups. Each group is to study all of the resources provided.)

Resource 1: (Foreign aid and development — cartoon)

- Apply ideas depicted in the cartoon. How possible and reliable is foreign aid in promoting development?

Resource 2 and 3: (Tyre shortage: CODECO faces closure — extracts)

- Examine these resources. How possibly and reliably could such industries be promoted through aid as a source of foreign exchange?

Resource 4: (A handle of a borrowed axe is easily broken; reasons why cattle shake their tails — folktales)

First tale (A handle of a borrowed axe is easily broken)

- Assume that: Axe = foreign aid; borrower = developing countries; tree = development. How possible and reliable could aid promote development?

Second tale (Reasons why cattle shake their tails)

- Assume that: Axe = foreign aid; borrower = developing countries; tree = development. How possibly and reliably could aid promote development?

Resource 5, 6, 7 and 8: (Cut on loans — says Banker: short term loans halted; IMF defends old policy; the debt crisis — Now what? extracts)

- Study these resources that provide some solutions towards the foreign aid problem. Do you agree/disagree with the solutions/actions suggested?
- Suggest a top priority of what needs to be done. Answer the questions on Resources 5-8 by filling the table below:

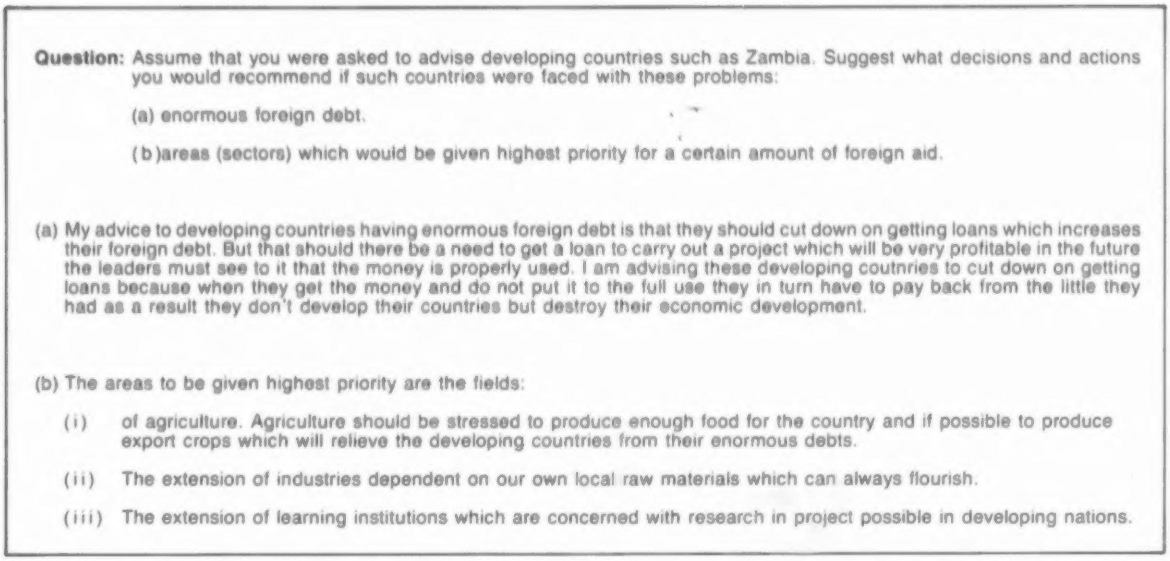
Resource No.	Solutions/Actions suggested?	Agree/Disagree?
5		
6		
7		
8	Default, relax lending policies etc.	

Top priority of what needs to be done:

Figure 27.2 A summary of the third lesson of the teaching unit on Foreign Aid

Item	Urban Areas	Rural Areas	Reasons for choosing urban areas (selected)	Reasons for choosing rural areas (selected)
1 Living for the rest of your life	XX	XXXXXXXX	'Because there are facilities'	1 'In towns ... it is becoming difficult to earn or have a home easily' 2 'Life is expensive in urban areas after retirement' 3 'Life is cheaper in rural areas e.g. food' 4 'I will be able to look after myself when I am old'
2 Your secondlary education	XXXXXXXX	XX	1 'To obtain good education' 2 'More teachers book supply' 3 'To learn latest ideas, using libraries' 4 'There are good teachers'	1 'Learning in rural areas you know how to behave'
3 Your higher education	XXXXXXXXXX		1 'Good schools are mainly found in towns' 2 'In rural areas, there are less colleges'	
4 Your employment	XXX	XXXXXXX	1 'that is where good jobs are found' 2 'There is more money and one can get a loan' 3 'More industries and companies'	1 'There is a lot of money to be earned' 2 'Standard of living' 3 'Food is cheaper in rural areas' 4 'People are well behaved'
5 Getting married	XXXXX	XXXXX	1 'It is easy to buy things for the wedding' 2 'More possible to get educated, husband' 3 'My husband and I may get a job'	1 'To follow my tradition' 2 'Expenses are much cheaper for rural wedding' 3 'Food is abundant and people are well behaved' 4 'Decent men are in rural areas'
6 Where your parents should live	XX	XXXXXXXX	1 'In case there is any problems, they can help immediately' 2 'So that I can live there while I am at school'	1 'so that when I go back, I will have somewhere to live 2 'So that I can easily help them on the land' 3 'To have them work and enjoy 4 'They can grow crops for themselves
7 Where you wsh to spend your holidays	XXXX	XXXXXX	1 'So that I can buy things which are not in rural areas' 2 'More entertainment in urban areas	1 'To learn my culture' 2 'Exciting and educative' 3 'To help people in the villages' 4 'To know more about rural areas' 5 'Because of abundant food'

Figure 27.3 Assessing students' value positions/preferences. X shows the responses of each of ten girls to the question: "Where would you like to undertake the following activities?"



Question: Assume that you were asked to advise developing countries such as Zambia. Suggest what decisions and actions you would recommend if such countries were faced with these problems:

(a) enormous foreign debt.

(b)areas (sectors) which would be given highest priority for a certain amount of foreign aid.

(a) My advice to developing countries having enormous foreign debt is that they should cut down on getting loans which increases their foreign debt. But that should there be a need to get a loan to carry out a project which will be very profitable in the future the leaders must see to it that the money is properly used. I am advising these developing coutnries to cut down on getting loans because when they get the money and do not put it to the full use they in turn have to pay back from the little they had as a result they don't develop their countries but destroy their economic development.

(b) The areas to be given highest priority are the fields:

(i) of agriculture. Agriculture should be stressed to produce enough food for the country and if possible to produce export crops which will relieve the developing countries from their enormous debts.

(ii) The extension of industries dependent on our own local raw materials which can always flourish.

(iii) The extension of learning institutions which are concerned with research in project possible in developing nations.

Figure 27.4 The unedited responses of one student to a decision making exercise in the Foreign Aid teaching unit

Section D

Curriculum developments in geography for the 1990s

28: CURRICULUM DEVELOPMENTS IN GEOGRAPHY IN THE 1990s

Norman Graves

This chapter is an exercise in futurology and, though the nineteen nineties are not too far away, it nevertheless involves a good deal of uncertainty, given the rate at which changes occur in the economy and in educational policy. As a result, an attempt will be made to judge the nature and direction of curriculum change in Geography based on the evidence of trends in education, in geographical research and in communications technology.

To some extent, there will be a tension manifest between what I would like to see happen and what is more likely to happen in reality. Wishful thinking is, however, not very helpful when it comes to facing the future, and I shall attempt to keep a firm grip on a probable scenario, rather than indulge in the impossible dream. In any case, though dreams are useful as catharsis, arriving at a realistic view of future events is, to me, satisfying intellectually. Let me start by indicating where I believe we are in terms of geographical education at the present time.

Geographical education today

Of course it is not possible to give a simple straightforward description of the nature of geographical education in a world context. One only needs to glance at Hartwig Haubrich's (1982) collection of essays on geography teaching in 30 countries to be aware of the wide disparity in aims and content, let alone in the practice of geographical education. Even within one country, as one travels from school to school, it is clear that the differences between the way the geography curriculum is put into operation are great. Indeed, it is still possible to see one teacher spending most of his or her time lecturing to a class of 14 or 15 year olds, whilst another may seldom address the class as a whole during geography lessons, work having been organised on an individual or group basis. Then, there are the vast differences in the resources commanded by a teacher in a developed country compared with one in a developing country. Even within a developed country, as in the UK, some state schools may be desperately short of equipment whilst some private schools may be extremely well equipped. The reverse may also be true. The best that can be done, is to indicate the kind of position that has been arrived at by a sizeable proportion of teachers, particularly in developed countries. This involves giving a thumb-nail sketch which may be inaccurate in detail, but which gives a reasonable indication of the general pattern. Perhaps the best way of characterising geographical education in the nineteen eighties is to examine in turn aims, content, teaching strategies and evaluation, all of which are elements in the total curriculum process.

Aims

If we look at aims, we find a degree of consensus. That is, geography is concerned with giving students an understanding of the interaction between people and their environment, this being interpreted as the physical environment and the urban and rural environment. From this arises the concern for environmental quality. It is also concerned with the spatial organisation of human activity, the spatial interaction which occurs between places and with the nature and character of particular places. Further, there is general agreement that though geography may be specifically concerned with these aims, it also contributes to developing abilities and/or skills which are common to many subject areas, such as logical argument, information processing skills, graphical skills and value analysis.

Content

If content is defined as the concepts, principles, skills and attitudes which are taught within geography, then again there may not be a great divergence of views as to what content should be taught, though this content may be expressed in somewhat different words and terminology in different countries. Such content may include map reading, knowing about and recognising physical processes in the atmosphere and on land, understanding the processes that lead to areal differentiation, analysing the factors affecting spatial interaction and so on. Inevitably, the context used to reach this content will differ. All countries tend to place a heavy emphasis on pupils knowing more about their own nation than others. Consequently, the home nation features prominently as a context used to teach the various ideas, skills and attitudes emanating from geography. In other respects the context used will reflect different criteria. Some syllabuses will place a heavy emphasis on the 'home' continent, some will wish to reflect a balanced use of examples from all continents (except Antarctica), others will use the framework of the capitalist world, the socialist world and the 'third' world.

The extent to which the ideas taught are up to date or not will largely depend on the quality of geography at the research level and the quality of pre- and in-service training of teachers. This is partly, if not wholly, a function of the resources allocated to this aspect of the education system. Thus in this respect the developed countries are much better provided than the developing countries, though within the developed countries there are marked differences which are a reflection of the priority accorded to education in the total economy. For example, it is clear that France and Germany have in the recent past valued education more than the UK, if one judges this by the proportion of the national income spent on education.

Teaching strategies

The greatest differences between countries are undoubtedly to be found in the teaching strategies and teaching aids used. Although resource availability is bound to affect teaching stategies, it is not the only factor; the very conception of what an education process is has a considerable effect. Thus, the greater the authoritarian tradition in the country and the greater the dependence on an official religion or ideology, then the greater is the likelihood that teaching strategies will tend towards the didactic in the sense of instruction of information to be committed to memory. Discussion and the examination of assumptions or issues will be discouraged. Although one tends naturally to think of theocratic states like Iran as prime examples of such authoritarian regimes, one needs to be aware that such tendencies are manifest in many developed countries, even though it may not be so overt. In the United Kingdom, the breakdown of the post-war consensus about education is leading to growth of directive measures and to an attempt to prescribe more narrowly what may be taught. Thus, initiatives like Peace Education come under scrutiny because they are thought to question official views about defence. In another, but related sphere, we have seen attempts by government to prevent books being published. Thus, the more open the society in Popper's (1946) terms the more likely it is that teaching strategies will be encouraged that pre-suppose individualised learning, that encourage group discussion or interaction, in which the teacher is seen as a catalyst or resource rather than the provider of irrefutable dogma.

Evaluation

To a large measure, the methods used in evaluation will reflect the same tendencies in society. The more open society will encourage a variety of assessment techniques including course work assessment. A closed society will want to ensure that its students have acquired, not to say been inculcated with, approved knowedge. I have elsewhere (Graves, 1981) attempted to develop a typology of stages in geographical education which has been tested out in one country (Ballantyne, 1987).

Thus geography is widely taught, though in the U.S.A. and in those states which have been influenced by American educational practice, geography is incorporated into social studies. Where this happens, the extent of geographical education is limited. The content of the geography taught varies in details though the general themes in physical and human geography outlined earlier tend to form part of most curricula. Teaching strategies and evaluation tend to vary according to the stage of development of the education system and the nature of the society within which it is embedded. But geography as a curriculum subject is under threat. It is threatened by the growth in the range of curricula activities and by the "new vocationalism" which has been a marked trend in some educational systems in the last 10 years (Naish, 1986). It is to developments in education that I now turn.

Trends in educational practice

If the contention that the nature of geographical education owes more to the ethos of the education system than to the nature of geographical research (Graves, 1987), then we need to look more closely at what is happening in education generally in order to assess its impact on geographical education. There is little doubt that since the late nineteen seventies, there have been changes in both attitudes to education and in the practice of education. These changes have been uneven and certainly have not affected all countries to the same extent; but they have occurred nevertheless.

What precisely have been the nature of those changes? First, the attitude that education, whatever its nature, would be a good thing and that all societies would be better societies if they developed their education system, has weakened even if it has not disappeared. Some economists used to argue that investment in education would bring forth an economically more productive society in due course. The case for investing in education in the third world was to a large extent based on this view, but the evidence from both the developed and the developing world have hardly corroborated it. Whether one looks at West Africa, Latin America or South Asia, the rate of economic growth has not been spectacular during the period when educational provision was expanding. Even if one considers the non-economic aspect of education, it is difficult to argue that there is an evident increase in the quality of life in various societies. In western societies and in the Middle East, there has been a notable increase in the extent of violence within these societies, with which we have been made aware by the mass media. There has therefore grown a feeling that perhaps education as at present practised was not achieving the aims which it has originally set itself. From this came a questioning of the efficiency of all educational institutions and of how far a society was getting 'value for money' for its investment in education.

These changes in attitude have not been universal, but they have been important, especially in the western capitalist countries. Associated with this has been a questioning of the precise nature of the education process and of the content of education. This has been most marked in those countries which already have free compulsory education from 5 or 6 to 16 years of age. It seemed that a significant number of secondary school students were disaffected from school and seemed not to benefit from its teachings. These were the so-called non-academic pupils. In a number of countries an attempt has been made to cope with this problem by associating schools with some form of industrial and commercial training and with placements in industry and commerce. In the UK these initiatives have taken shape through the

Technical and Vocational Education Initiatives (TVEI) and through Youth Training scheme (YTS), both of which were initiated and financed by the Manpower Services Commission (MSC), not by the Department of Education and Science. Similar tendencies were manifest in France and Germany at an even earlier stage.

Perhaps it might be appropriate to use the example of the TVEI scheme in England and Wales as an illustration of what is happening. An organisation, the MSC, an offshoot of the Department of Employment, had two main purposes: to assist people in finding employment and to provide training which would better fit people for new jobs. It gradually took on a more direct role in education, first by providing training for young unemployed people (the Youth Opportunities Programme later to become the Youth Training Scheme), and then by launching the TVEI scheme in schools. The latter scheme was started as a series of pilot projects in selected local education authorities in 1983 for the 14-18 year olds, beginning with 14-16 age group. Thus a school department wishing to take part in the scheme needs to structure a programme of work which relates to a group or family of occupations which are relevant to the area in which the school is situated. The nature of the programme has to lay a heavy emphasis on skills and abilities which will be helpful to employers in the area. It has also to be approved by the MSC, and to lead to an approved qualification like the General Certificate of Secondary Education (GCSE) or the General Certificate of Education (GCE) at Advanced Level, or a certificate of the City and Guilds of London Institute Foundation Course and/or of the Business and Technical Education Council's (BTEC) General Courses (Graves, 1985). The most significant part of this whole approach was that schools which adopted the TVEI approach were enabled to command much greater resources (derived from the MSC) than those which did not. Thus equipment, including computers, became available in amounts that made a difference to the departments and schools concerned at a time when resources in education generally were being cut back by a general squeeze on Local Authority spending by the Central Government. Thus power to affect change in education towards the 'New Vocationalism' was being given to an organisation not primarily concerned with education.

A corollary to the vocationalization of education is that some subject areas are likely to be seen as less relevant and less important than others. Thus while some teachers may be relatively successful in getting geography involved in TVEI for example (Davidson, 1984), there is little doubt that in general, geography will not be seen as a subject carrying much weight in vocational education. As such, one could expect the subject to lose 'customers' in the near future. Indeed, given the fear of unemployment and the desire to study vocationally relevant disciplines, the trend is already there as a recent article entitled "Where have all the Geographers gone?" (Lee, 1985) indicates in the case of the UK.

It is important to bear in mind that the pressure to change both the objectives and the content of general education in favour of more 'useful' subjects, is also associated in some countries with an attempt to make schools more responsive to the 'market', of parents, employers and the community in general. Although steps in this direction have not gone very far, the ultimate aim of some would be to go along the road to privatization by favouring independent schools and limiting the powers of public education authorities with respect to the schools under their control. As Crispin (1985) shows, the extent to which pressures are applied to education authorities depends on the allocation of finance.

Interestingly, these trends in education are to some extent leading to a greater degree of uniformity as between education systems. Thus in the UK, or at least in England and Wales, the Secretary of State for Education and Science is keen to introduce a national curriculum, instead of the present somewhat anarchic situation in which virtually each school decides what is to be taught. Thus the UK was in 1987 about to join those countries like France and Japan which already have a national curriculum. At the same time, the pressure on curriculum time, is leading to a number of experiments with a modular curriculum (Watkins, 1986). This in effect means that courses in particular subject areas would not necessarily be continuous through the secondary school. Thus courses in geography might be split into discrete modules of 6 weeks or 12 weeks each, taken by students at different times. How far the modular curriculum which inevitably introduces an element of choice is consonant with the idea of a national curriculum, is a moot point.

All this is happening at a time when attitudes to education are hardening. By this I mean that authorities and, to some extent, the general public are demanding that the education system in general and teachers in particular become accountable. It is symptomatic of this trend that a book with the title 'The incompetent teacher' (Bridges, 1986) could be published in recent years; that experiments on means of teacher appraisal are going on in various countries (Farley, 1986) and that educational expenditure is being scrutinized carefully at all levels from the primary school to university. Yet, it is also a time when the concept of value for money in education is also associated with a desire to render the education process more efficient. Can this happen without increasing the quality of teachers and of the infra-structure with which they work? Does this not involve an increase in investment in education?

Whatever the ideological undertones to existing and proposed changes to the education of future generations, there is little doubt that changes have occurred in the past 20 years which have resulted in a greater professionalism being evident in many schools. What has this meant in practice? At the level of the curriculum, it has meant a greater explicitness about what was to be taught and to some degree about how it was to be taught. Curriculum documents in geography as well as in other subjects are more elaborate than they once were, and are liable to be revised more frequently. At the level of school organisation, there is a more explicit management structure in which various teachers are allocated functions which correspond to the expanded functions of the school - year heads, heads of pastoral care, curriculum director, and so on. At the level of evaluation, the nature of examinations has changed radically to enable a wider range of skills, abilities and knowledge to be tested. All these have some impact on the ethos of the school and on geography as part of the curriculum.

Trends in geography in higher education

Turning now to what is happening in geography in higher education, I shall be relatively brief since there exists a large number of books and journals whose purpose it is to keep us informed in this area; to quote but three: Johnston's *The Future of Geography* (1985) and the *Progress in Physical and Human Geography* series. I shall concentrate on those areas of geography which might have a significant impact on the school curriculum.

To begin this section it is necessary to indicate that there are two aspects to what is happening in higher education in relation to geography. The first is in developing view of geography as a medium of education. It may seem strange to state this, but traditionally geographers in higher education have not been much concerned with the educational value of their subject except as a spin-off benefit from their research activities. It is clear, however, from what Gould (1985) and Powell (1985) write that they have given much thought to this recently. Now this is much to be praised, though one needs to admit that in this respect they are covering ground which specialists in geographical education trod long ago. They are concerned with the ultimate purposes of teaching and learning geography in a higher education setting. Thus for Peter Gould to argue that learning geography should be 'liberating' is not very different from saying what Fairgrieve (1926) wrote when he argued that geography should enable students 'to live' as well as earn a living, or what Peters (1963) wrote when he saw education as a 'mind opening' process, or indeed what Socrates probably said in Greece long ago. What I am saying is that welcome though this particular trend is, it really represents higher education catching up with the thinking which has gone on in relation to school geography.

The second aspect of developments in geography in higher education is the research aspect. It is here that research geographers have an important contribution to make because they are advancing the frontiers of knowledge and schools need to take note of what is happening. It is, of course, a matter of value judgements as to what kinds of research findings are appropriate for use in schools or college. However, I hold it as a fundamental tenet that if the school geography curriculum strays far from developments in research as happened to some extent in England in the fifties and early sixties, then that curriculum becomes inert as an educational instrument.

What then is the kind of research which is likely to influence the geography curriculum of the immediate future? In answering this question, I am making a judgement as to what I believe to be significant, which may not be your judgement. First, within the earth sciences, it seems evident that in geomorphology the trends of the past 20 years will continue. This means that notions of stability and slow change over time in relation to processes need to be replaced by what has been called the neotectonics (Brunsden, 1985), the idea that the earth's surface is moving all the time or stressed, but at different rates and that land forms are often the result of short term but catastrophic changes, rather than slow evolutionary changes. Superimposed on short term changes are long term environmental climatic modifications probably caused by the earth's orbital changes. I believe that an understanding of changes in landscape and climate will always excite those beginning to come to terms with their environment. Another aspect of geomorphological research is in its applied form, in which, for example, knowledge of geomorphological processes can help planners to avoid mistakes in road or bridge building or in urban development.

In human geography the picture which emerges in my mind is not so clear. This is probably because the problems tackled by human geographers are more varied in kind and there is less methodological consensus than in physical geography. But casting these doubts to one side temporarily, it seems likely that human geographers will continue to tackle the great problems which afflict us in the world. They will continue to examine disparities between regions (Keeble, 1984), they will continue to tackle the problems within urban areas (Gold, 1985), they will continue to enquire into the distinctive character of places (Muir, 1985), and they will continue to examine the nature and working of communications networks (Banister, 1984). How they do this will vary considerably. Whatever the mistakes by the early quantifiers, the use of quantitative methods will continue for those problems for which they are suitable and as an aid to theory building (Bennett, 1985). Perhaps more importantly, the research is likely to be guided by values held by the researcher and/or the society in which he or she is working. Thus, much research is now financed by governments and reflects the perceptions of political authority as what constitutes a problem area needing investigations. This is as true in geography as it is in education. But there is still room for individual research which reflects individual values. Thus research commissioned by governments and research commissioned by Greenpeace, for example, on nuclear power station location is unlikely to come to the same conclusion. It is perhaps the greater consciousness of the value positions held which distinguishes geographical research today from that undertaken 20 years ago.

To my mind what is likely to influence geographical education in schools is not so much the precise techniques used by researchers at the higher education level (though some may be appropriate) as the kind of concerns which they have about regional disparities in income, centre to periphery relationships, urban segregation in housing, access to public services, declining public transport, environmental quality, the transformation of rural areas and so on.

Curriculum development in geography in the future

In this section I will attempt a little crystal ball gazing into the last decade of this century. In fact, it is not very far off and as someone who can look back a fair distance into the past, I would argue one should probably look beyond the 1990s to the 21st century to get a true perspective. What will the world be like into which we will be launching our pupils and students?

It will be a world in which technological change will be much in evidence. If my own lifetime is anything to go by, we have moved from an age when to travel two hundred kilometres was an unusual event, now I sometimes travel by car one thousand kilometres in one day and several thousand kilometres by air. It was difficult in my youth to 'phone long distance. Now it is commonplace. Calculating machines were mechanical, now they are electronic and micro-computers can carry out operations undreamt of 30 years ago, in a matter of a few seconds. Information was stored in elaborate paper files, often in handwriting, now it is stored electronically on microchip. Fibre optic means of communication are now beginning to displace purely electrical communication. It was rare in my boyhood to possess a radio-set, now almost everyone has a television set, often with computer monitor facilities to link up with such information bases as Prestel.

The inference is clear. In the 1990s and in the 21st century, this process is likely to go on, particularly as the equipment used is not bulky, is coming down in price and does not use a great deal of power. Thus a learner of the future is likely to have at his disposal a personal computer, a video player with monitor, a telephone line working with a fibre optic network, access to numerous data banks, including those designed to teach certain skills and concepts from the main branches of knowledge. It could well be that in the future a school will be a centre to which the student comes for advice, for tutorials, for feed back, for evaluation sessions, rather than a place which he attends from 9.00 to 16.00 hours. The question to be asked is how long the change-over from traditional school to a learning and tutorial centre will take. This may well depend on the willingness of governments to invest the necessary capital in education. There is also the question of how far the custodial functions of school will continue. If parents do much of their work at home, as might well be the case in an information society, then the custodial function of schools may disappear. It is a change-over which is clearly going to take longer in some countries than in others.

In certain other respects, the world may not be very different from what it is in the 1980s. It is likely that some sort of accord will occur between the superpowers about nuclear weapons which will diminish the risk that we shall all be eliminated as a species. On the other hand, human nature being what it is and national pride being bolstered by myths or achievements, it is likely that local or regional conflicts will go on with the Middle East and Central America being flashpoints for such conflicts. The developing world will develop, although Asia, and in particular China, is likely to develop faster than Africa or Latin America. This means that the economic context may be somewhat different in the early 21st century from what it is today. But it is doubtful, unless there is an enormous 'volte-face' on the part of the developed nations in their attitude towards aid, whether the discrepancies in incomes between North and South will diminish. I am conscious, having recently undertaken several assignments in Bhutan (one of the least developed countries) how great is the gulf between the resources available to such a country and those available to a western country. Yet there is no discrepancy in our common humanity. The tendency for the developed nations to consume a greater and greater proportion of the earth's resources will need to be curbed. This is a moral problem as well as an economic one. It is reassuring to know that in a large conference devoted to "Science and Technology Education and Future Human Needs", an important section was devoted to "Ethics and Social Responsibility in Science Education" (Frazer and Kornhauser, 1986). The terms of trade need to move steadily in favour of the developing nations as they did in relation to the oil producing and exporting countries (OPEC) after 1973. Also intractable is the problem of the disparities between regions within a country. This problem, if we take the UK as an example, has got steadily worse in the 1980s with the north of Britain having a lower income per capita than the south, more unemployment, a generally degenerating infra-structure including a poorer quality housing stock. Growth polls and sunrise industry belts have their obverse in the "sunset" industrial areas. Similarly within cities, the decline of certain parts of the inner city areas are exaccerbated by ethnic divisions in the populations. None of these are new problems, but they are likely to be with us in the 1990s and very much on the agenda for geographical education.

One of the developments in geographical education which is already on the scene in response to changing economic conditions is that which seeks to develop in pupils a positive attitude and understanding of industry (Corney, 1985). The pressure which has come from governments to make education more instrumental in its aims has had its effect in England in the setting up of the Schools and Industry project and in the Geographical Association's publication "Geography, Schools and Industry". I would guess that such pressures for content relevant to Government policy is likely to grow. A second area of content likely to develop, also under pressure from economic trends is the development of information collecting, storing and processing skills. This is already underway but not yet as widespread as it will be in the 1990s. Students will be asked to collect, store and process information related to geographical problems electronically. This is really part of the development of technology as outlined earlier, but it needs to be done within a framework of values about human life and human relations, about environmental quality and about relations between states. The technical skills acquired will avail us nought unless we can use them with tolerance and wisdom. As we know too well, the know-how is already with us to solve a number of environmental problems from acid rain to lead in petrol exhaust fumes. What is lacking is the political will to put preventative measures into effect.

Conclusion

I shall now attempt to synthesise this rather wide-ranging survey into a brief summary.

Whilst no startling changes are likely to occur in the state of the world in the next decade, one can expect present economic trends to develop in the direction in which they are at present growing. This means that incomes will grow but not at a high rate, and as a consequence resources available to education are unlikely to grow rapidly. This is compounded by the attitude of some governments to education, which is somewhat sceptical of the benefits of general education and would like to encourage an instrumental view of education, an education of direct use to industry and commerce. Whilst this view of education may be both mistaken and too narrow to achieve the purposes it is meant to achieve, it is nevertheless an influential view which has already had an effect in several educational systems. It is often coupled with economy measures which restrict educational activity.

The rethinking of the curriculum content of education has emphasised those aspects of the total curriculum which are seen as vocationally useful (science and mathematics in particular) to the detriment of the humanities including geography. Among the notions which are finding favour among curriculum planners to accommodate the growth in the total curricula is that of a modular curriculum. If taken up, it would imply an "a la carte" system of modules in various aspects of geography. Thus, though interesting developments are occurring in both physical and human geography there is no guarantee that a student in school under a modular curriculum would necessarily be exposed to these unless certain modules were made compulsory. What is certain is that the content of geography which will be taught in schools will be considerably less than at present. Already the trend is to concentrate on those transferable skills and abilities which are not unique to geography and merely to use a geographical context in which to teach them. The learning environment is likely to be dominated by the products of modern information technology. The geography teacher will be a guide, tutor, evaluator, not necessarily in daily contact with his students. Is this likely to help or hinder the essential mind-opening function of education?

Teachers of geography will need to decide what they can do in a small way to develop the values in which they each believe. They are unlikely to be able to change the course of society, but they can act, to use the term used by Relph (1976), as "existential insiders" with respect to both geography and the students in their charge. In this way they may be "Teaching Geography for a Better World" (Fien and Gerber, 1986).

Case Studies and applications

The studies which follow begin with a provocative statement by JEAN MARECHAL calling for geographical educators to rethink the role of the process of epistemological reflection in the didactics of geography. We are encouraged to focus on geography as social space and to consider the place of the physical and social environments in it. This leads Marechal to make a plea for educators to reconsider the subject matter of geography curricula and to diversify its contents. He considers that in-service education has a key role in this process.

BILL MARSDEN presents a case for using primary schools and their environmental settings around the world as a means for developing empathy in world studies. He demonstrates how case studies from different schools throughout the world can be used to explore similarities and differences in welfare geography. Such micro-scale considerations can be used in geography lessons to improve both environmental awareness and human rights education.

A substantial attempt to revive geography in the K-12 curriculum in the U.S.A. is described by CHRISTOPHER SALTER. Through the development of the Californian Geographic Alliance and its evolution into the National Geographic Alliance network, there has been a concerted effort to raise the status of geography in the U.S.A. A major side effect of this network has been the unification of geographical educators across the country. Despite these achievements, geography still has a long way to go to reach the status of subjects such as history.

Another example of curriculum development in geography is described by HARTMUT VOLKMANN who outlines recent changes to secondary geography curricula in selected West German states. Hartmut highlights the variety of these changes and sounds a note of caution about the trend back to regionalism that has occurred as politicians react against environmental action groups. Instead of promoting critical citizens, these recent changes are designed to develop submissive citizens.

SONIA CARNEIRO and PAUL ANDERSON present two studies that emanate from the work of Bloom and his associates on different levels of thinking. Sonia's work focusses on her research in the Brazilian state of Parana where she developed a comprehensive set of objectives for using field and laboratory studies in lower secondary geography teaching. This set of objectives has broad applicability for geography curricula in countries around the world. Paul Anderson from the U.S.A. builds upon the levels of thinking proposed by Bloom to develop the technique of Multi-Digital Testing and to apply it to geographical education. This method, it is suggested, is very good for testing basic geographical knowledge and higher-order thinking questions. Detailed examples are provided to illustrate the method. It is proposed as a manual or a computer-assisted technique that can be used in most countries in geographical education.

The final contribution by MICHAEL MORRISSEY demonstrates how the development of local geography textbooks by teachers in different Caribbean countries can be a very constructive curriculum development experience. These books were developed for the Caribbean primary Social Studies course. It was a process that had its ups and its downs. However, with the support of national governments and the United Nations, teams of teachers succeeded in developing these books and they acquired a valuable lesson in their own continuing education along the way. This process seems very well suited to countries with limited resources to spend on education.

REFERENCES

Ballantyne, R. (1986) *Change in Secondary School Geography Education: Teacher Attitudes and Practice*, unpublished PhD Thesis, University of Cape Town.

Banister, D. (1984) "Policies for Public Transport in Short", J. and Kirby, A. (ed.) *The Human Geography of Contemporary Britain*, London, Macmillan.

Bennett, R.J. (1985) "Quantification and Relevance", in Johnston, R.J. (ed.) *The Future of Geography*, London, Methuen.

Bridges, E. (1986) *The Incompetent Teacher*, Lewis, U.K., Falmer Press.

Brunsden, D. (1985) "The Revolution in Geomorphology" in King, R. (ed.), *Geographical Futures*, Sheffield, U.K., The Geographical Association.

Corney, G. (ed.) (1985) *Geography Schools and Industry*, Sheffield, U.K., The Geographical Association.

Crispin, A. (1985) 'Finance as a means of control in English Education: recent trends towards centralization", in Lauglo, J. and McLean, M. (ed.), *The Control of Education*, London, Heinemann Educational Books.

Davidson, G. (1984) "Geography and the Challenge of TVEI", *Teaching Geography*, 10 (1), 3-5.

Farley, S. (1986) *Classroom Observation*, Times Educational Supplement (29.6.86).

Fairgrieve, J. (1926) *Geography in School*, London, University of London Press.

Fien, J. and Gerber, R. (eds.) (1986) *Teaching Geography for a Better World*, Brisbane, AGTA & Jacaranda Press.

Frazer, M.J. and Kornhauser, A. (eds.) (1986) *Ethics and Social Responsibility in Science Education*, ICSU Press, Pergam.

Gold, J.R. (1985) "The city of the future and the future of the city", in King, R. (ed.) *Geographical Futures*, Sheffield, U.K., The Geographical Association.

Gould, P. (1985) "Will geographic self-reflection make you blind?" in Johnston, R.J. (ed.), *The Future of Geography*, London, Methuen.

Graves, N.J. (1981) "International aspects of geographical education", *Journal of Geography*, 80 (3), 84-86.

Graves, N.J. (1985) "Geography in Education: a Review", in Kent, A. (ed.), *Perspectives on a Changing Geography*, Sheffield, U.K., The Geographical Association.

Graves, N.J. (1987) "Research in Geographical Education" *New Zealand Journal of Geography*, 84, 15-18.

Haubrich, H. (ed.) (1982) *International Focus on Geographical Education*, George - Eckert-Institut fur internationale Schulbuchforschung, Braunschweig.

Johnston, R.J. (ed) (1985) *The Future of Geography*, London, Methuen.

Keeble, D. (1984) "Industrial Location and Regional Development", in Short J.R. and Kirby, A. (ed.), *The Human Geography of Contemporary Britain*, London, Macmillan.

Lee, R. (1985) "Where Have all the Geographers Gone?", *Geography*, 70 (306), 45-59.

Muir, R. (1985) "The Future of the British Landscape", in King, R. (ed.) *Geographical Futures*, Sheffield, U.K., Geographical Association.

Naish, M.C. (1986) "Geography in British Schools: A Medium for Education", in Husa, K., Vielhaber, C. and Wohlschlagel, H., *Festschrift Zum 60 Geburstag von Ernest Troger*, Wien, Ferdinand Hirt.

Peters, R.S. (1963) *Education as Initiation*, London, Evans.

Popper, K. (1946) *The Open Society and its Enemies*, Routledge.

Powell, J.M. (1985) "Geography culture and liberal education", in Johnston, R.J. (ed.), *The Future of Geography*, London, Methuen.

Relph, E. (1976) *Place and Placelessness*, Pion.

Watkins, P. (1987) *Modular Approaches to the Secondary Curriculum*, Harlow, U.K., Longman for the School Curriculum Development Committee.

29: AN EPISTEMOLOGICAL AND DIDACTIC REFLECTION ON GEOGRAPHY

Jean Marechal

The purpose of this paper is to discuss the place and role of epistemological reflection in the construction of the didactics of geography. The function of epistemology in a process of didactic reflection is to propose "proven knowledge" to the geography teacher. In order to avoid widening of the gap between geography as a science which is in the making, which changes every day, and the subject geography as it is taught, it is absolutely indispensable to think seriously about the content. Epistemology as a mode of expression reflects on the production of geography; the conditions of that production; the procedures used to check and validate geographical knowledge and the status of the different branches of the discipline.

Although epistemological reflection constitutes a necessary part of the didactics of the discipline, it is not enough in itself. The "territory" of the didactician is broader. If one is to study one's profession, one must: take into account the characteristics of the learners and understand their relationship to knowledge; know and have mastered the techniques of the act of teaching; and be able to place this discipline in its context in the general educational system. This is important because of the value-laden nature of geographical studies.

In short, the realm of didactics is not confined to epistemology or psychology, or pedagogics, or to a general educational project, but is rather the product of the interplay between these four fields.

The role of epistemological reflection in the didactics of geography may be defined as the study of the contribution of geography to the main branches and the adaptation of this knowledge to a school subject. These will be the two foci of this paper.

In search of proven knowledge

Epistemology is initially concerned with the history of the discipline, which enables it to discern the formation, deformation and readjustment of key organising concepts and to expose the origin and the development of the questions which geographers use. It is indispensable to trace this historical development in order to show the relativity of knowledge, the dynamic movement of scientific knowledge with its crises, its mutations and its epistemological remodelling.

In brief, the methodological revolution of the nineteen fifties (with the introduction of quantification) has been the main stimulus for reflection since it provided an opportunity to reconsider the old problem of defining the purpose of geography and the debate on the relationship of physical and human geography. Over the last twenty-five years there has been a great deal of discussion and thought on the subject, as if people were anxious to make up for lost time. The dynamism of this movement is such that by comparison, history, which was concerned about its scientific status much earlier, seems to be stagnating in the field of epistemology and resting on its former theoretical certainties. Geography is certainly less organised, but it is progressing.

Until the 1950's, the work of the geographer was very similiar to that of the naturalist. It was a reasoned description explaining the physical and cultural landscapes of the world. The geographer drew up the inventory of the diversity of the world, of ways of making the best use of the environment, of nuances in the landscapes and different ways of organising territory. Geography, in Vidal de la Blache's words, was a "Science of places" and did not put people at the centre of its preoccupations. Social phenomena were touched on, but very rarely according to their own rules.

Geography came out of its ghetto about twenty years ago and since then it has moved towards other social sciences (economics, ethnology, sociology, psychology...) and present day needs. Geography wants to be a discipline which takes people and society into account. It has become a social science, while still taking the constraints of the environment into consideration. Its aim is to study the spatial mode of existence of societies, to ask questions about the running of local, regional and national units, to explore the forms which society takes according to the different countries and levels of development, to understand and integrate into one's analysis the identity of individual choices, the mental pictures and each person's desire to act according to his or her own mental set.

In other respects, geography has left its empirical approach behind. Like all other sciences, it aims today to proceed according to a hypothetico-deductive model and has started to think about itself, its objectives and its methods.

The object of geography: social space

Geographers nowadays generally agree on a definition of geography as a "science of the spatial organization of societies" and take social space as the object of their study.

Indeed, what geographers consider as space is not space in itself, the absolute space of the geometrician, the mathematician or the philosopher which masks space as determined by social structures, but "social space" in the full sense of the term rather than in a metaphorical sense. It is space as it is used, planned, organised and dreamed of by a social group, a society. The concept of "social space" tries to integrate the twin concepts of the social and the spatial.

It is possible to differentiate several different levels of approach to the concept of social space.

Firstly, the adjective "social" refers to the way a social group plans, models or creates a space. In the field of agriculture, it is the social group's response to the challenge of natural constraints (terraces, drainage, irrigation, selection of species, suitable agricultural system...). This "appropriation" of space is limited by certain natural constraints which can be reduced through scientific and technical development, to varying degrees according to the capital at the group's disposal, but taking into account certain constraints which cannot easily be controlled. This appropriation also implies taking on the inheritance of previous generations such as the impact of medieval forest clearings in the Southern Alps, or that of colonial-type occupation in third world countries. In an industrial and urban context, "planned space" refers to all architectural structures such as residential buildings, places of work and various superstructures, and the many different developments, typical of industrial and urban activities.

The adjective "social" can also be said to refer to the projection of social relationships on to the ground. Depending on the society, these social relationships may be based on kinship, ethnic origins, or work relationships. The imprints of the social relationships created by work can be clearly seen in rural space in land structures and different status of farmers as well as in urban and industrial space. Yesterday, they were associated landscapes and today they are dissociated landscapes in which the place of work and the place of residence are quite separate. The organization of urban space as shown in the lay-out of the streets or blocks and the architecture of the buildings reflects the social content. In short, social space, this ground projection of the society which has created it, is the reflection of differentiations, tensions, contradictions and competition between the social groups. It represents the prize for the winner of the social stakes.

Finally, one should not forget that the notion of social space is not confined to problems of society. It is also concerned with individual logic, created, it is true, by mental attitudes which have been produced by social groups but which are nonetheless assimilated and transformed into specific behaviour patterns such as our types of purchases, choice of leisure activities and choice of habitat, etc.

The question of physical geography

It is not the writer's intention that the field of physical constraints should be either neglected or given undue attention in this statement. Physical constraints have their place beside other constraints such as technical, demographical, economic, historical, cultural and mental.

Geographers are inevitably interested in people's relations with the natural forces and environment (physical and biological). There is always a debate as to the respective roles of people and nature, but one should never forget that nature's role is modified by people and that the notion of "natural environment" which is still used out of convenience nearly always corresponds to an environment which has been marked by human societies.

For the geographer it is a question of systematically taking into account the interrelations and interactions between the different fields, based upon the established facts of sociological observation and using these facts to answer all the questions which arise from the following:

- Why here and not elsewhere?
- Who benefits from this and to whose detriment is it?
- How can you promote or block a given evolutionary process?

The debate over physical geography is too often obscured by confusion between two options: the study of the environment as such, considered independently of the people who live in it, and ecological analysis, the study of societies in their relationship to the natural environment. Do geographers, in the exercise of their profession really have to assume the advances in knowledge of the "natural logic" of the earth? Cannot geomorphology and climatology be integrated with biogeography, geology and meteorology?

In short, to take "social space" as the object of one's study does not mean that "natural problems" have been forgotten, omitted or deliberately put aside, but rather that the advances in knowledge in those sciences which aim to study "natural logic" become an integral and functioning part of geographical reasoning.

Indeed, geography defined as the study of Society through space has become a social science on a par with history, economies and sociology. Its field in the whole gamut of knowledge about society, is space, which is one of the vital dimensions of society. The aim of geography is to see through the logic of all the modifications made by people on the face of the globe or to decipher societies' writings: taking into account that it is characteristic of a geographical approach to start from space in order to teach the society.

Geography's three essential preoccupations

Geographical knowledge and its expression are centred around three main ideas: firstly, the "ecological use" of space, secondly, "the organization of space" and thirdly, the "differentiation of space" into socio-spatial classes. Let us look at each of these preoccupations in detail.

1. The ecological use of space

Geographers are concerned by ecological questions in that they analyse how a social group or a society protects or wastes its "natural potential". They use the knowledge of "natural logics" which they have gained from studying the findings of earth and life sciences on different environments to expose the natural constraints, the upsetting of the equilibrium, the wastage of ecological potential as in erosion caused by people, and the overexploitation of natural resources such as occurs through pollution. They may then suggest ways of intervening to protect or regenerate the ecological potential or to compensate for ecological imbalances.

For geographers, the physical world is not the starting point, the priori setting for argument and reasoning. It is important in so far as it provides a context for the problems met by the social group. Thus, the physical world may provide "constraints" but may not be regarded as merely natural data. The latter are considered to be indifferent to societies, the former, on the contrary, may be expressed in terms of technical resources, or of costs.

2. The organization of space

Geographers' second concern is with spatial organization, the relations of the social group or society with space considered as a basis for exchange. They search for an answer to the question which has (traditionally) been of primary importance to geographers: the question of relative localization.

- What is to be found in this place?
- Why is it here and not elsewhere?
- Why is it present in greater numbers here than elsewhere?

They try to understand the spatial distribution of population and the relative distribution of assets and to establish laws which account for the flux pattern, the axis, the networks and the poles. In order to do this, they have to take into consideration both the global logic of the society and the personal logic of the individual. This may involve consideration not only of, for example, the distance between places in terms of "objective" distance measured in time/space equation or time/cost, but also in terms of subjective perceptions of this distance.

Models of spatial organization are built from various principles. These principles state that:

a) the social division of labour, because it implies specialization and therefore exchanges of labour, expresses itself spatially in terms of a specialization of industrial sites and service areas.

b) once the differentiation between places has been established, space is structured according to distance and leads to the hierarchical structure of industrial sites and service areas. The hierarchy of villages and towns as service areas is the most commonly quoted example of this aspect of spatial organization. The organization of space can also be explained by the importance of the various constraints: the physical constraints whose importance has been overemphasized in our countries by the mass media as regards the developments carried out by previous generations and the historical constraints which comprise the sum of inherited ideas and mentalities whose effect is complex and even contradictory. The presence of industrial or agricultural activity makes cumulative growth easier but may encourage inertia in the diffusion of innovations.

c) stable organizations exist when a system is operating in equilibrium, that is to say, in such a way that the context of actions and reactions, of interactions, and feedback systems limit the evolution of the system.

However, spatial organizations also appear historically with the implantation of "new systems" which may be the result of random elements. Geography is thus using the theory of catastrophes, of bifurcations and of systemogenesis, as it has been developed by physicists and mathematicians. There are critical periods in the history of a space during which the organization of the space undergoes modifications which then become stable. The classic example in France is that of the low-lying Mediterranean plains which had all been developed in a fairly similiar fashion until the advent of the railway. From then on their evolution diverged quite sharply and has continued to do so. A random event thus created an irreversible situation.

In a general sense, these principles do not seem to consider the social dimension as being relevant. This, of course, is not the case. The organization of space can generally be explained by economic decisions made at different levels. There is competition and rivalry between the different economic agents who take their decisions at different levels, ranging from the individual or family-level micro-decision right up to the macro-decisions taken by the State or multinational firm in conditions of conflict which can be explained by the usual sociological models.

3. The differentiation of space

The third major preoccupation concerns the "differentiation of space" into socio-spatial classes. A socio-spatial class corresponds to the space defined by a territorially organized group - it is their "territory". This spatial differentiation applies to every scale, from the block to the urban or rural district, from the town to the world, including every intermediate step - the region, the nation, large blocks of countries like the EEC, all the industrialized countries of the world or the developing countries.

The essential thing with this approach is to grasp the connections between the socio-spatial classes on the same scale, to understand their place and their role in relation to each other and to comprehend the dissymetric links which frequently bind them.

This domination of one space by another can be defined both objectively and subjectively. Different social groups live with this domination in their everyday lives and are more or less conscious of it. It leads to conflicts which may result in a demand for socio-spatial justice by the socio-spatially deprived classes, at district, regional, national or supra-national scales. On the other hand, there exists a tempation to exert socio-spatial egoism by the socio-spatial classes in a dominant position. In this conflicting relationship between centre and periphery, the power of the state (in a metaphorical sense) intervenes to reduce the inequalities and/or tries to iron out the differences. At the national level, it is the notion of a national development programme; at an international level it is the whole of North/South relations, more of less coordinated by international organizations.

These three overriding preoccupations of the "new" geography are valid whatever the scale involved, from a plot of land to the planet considered as an eco-system; from a block or a district of a town to the world including every intermediary step, from the region to the nation. The models defined on one scale are applicable, with a few minor alterations at all the other levels. For example, in spatial analysis, Christaller's theory of central places, which was based on analysis of problems at a regional level, enables one to understand the hierarchy of retail trade and services in an urban area. In addition, still in the field of spatial differentiation, the centre-periphery model can be transposed from the relationship between town and country to a world scale and all the intermediate steps.

Geographers nowadays admit that every degree of the scale deserves attention and that no degree is more geographically important than any other. The vital question has two parts: firstly there is the question of the interlocking system, of the relationship between different degrees in the scale and secondly the question of the choice of the most appropriate scale for the study of some particular aspect of a chosen subject.

This approach leads one to stress the important changes which have taken place in the discipline. After a geography which was firmly anchored in an analysis of relations between natural conditions and societies and centred on the integrating concepts of "environment", "landscape" and "region" whose multiple meanings have led to many a misunderstanding, the "new geography" has taken knowledge of "social space" as its main project by asking three essential questions at every degree of the scale:

1. How do societies fit into eco-systems?

2. How is social space structured and organized?

3. What distinguishes one block of social space from another and how do people react to these differences?

The integrating concepts of the new geography are: the eco-system, distance, polarization, socio-spatial class, centre and periphery.

The didactic implications

It is vital to promote and develop an authentic geography to avoid there being too great a dichotomy between new theories in geography and the subject as it is taught.

Based on the findings of the cognitive psychologists such as Piaget and Bruner, it is quite conceivable that a student may quickly pick up the basic ideas and methods of a discipline. It would, of course, be out of the question to introduce university-level geography at secondary school level, or even less at primary level, but one should be able to transpose the fundamental ideas and to retain the principles of geography by using epistemological data to make cultural choices.

An educational project of this kind should follow two essential directions: students must learn how to think about "space" and be taught how to master geographical reasoning. Thinking about space does not mean the geography of capes and bays and listing the elements, the constituent parts of reality (relief, climate, vegetation, population, economy) which often results in the masking of the political dimension of everything which concerns space. Neither does thinking about space mean thinking of it in terms of an actual space, alive and tangible, but being aware of it also as an "abstract space", situated beyond the immediate reality.

In this respect, the example of landscape is significant. It should continue to be part of daily pedagogical practice because landscape belongs to the range of geographical phenomena which are at the most ordinary, everyday level and are most easily accessible for field work and photography. One should, however, always bear in mind that the visible reality is only the tip of the iceberg. It is the most superficial aspect visible to the eye, the semblance of which may divert one's attention from the real relationships present in the area.

It is true that the landscape "bears witness" to economic transformations. A farmer's determination to rationalize his work can be seen in the clearing of the hedges. The equipment of snow-covered slopes in a mountain range is living proof of the desire to mobilise all resources and also provides an example of the penetration of the leisure society. However, the landscape is a concrete space of limited size and the abstract spaces such as demographic space of daily commuter travel and economic space in the towns which depend on it cannot easily be explained. It therefore follows that the landscape is not capable of reflecting the process of structure that has made it what it is.

Furthermore, the landscape is not only an incomplete reflection, it also deforms reality. Certain visible elements no longer correspond to present day reality. They are only a relict, feature from the past. The same sign, the same clue (recent buildings in a village for instance) may correspond to different "realities", such as a village popular with tourists, a dormitory village for a nearby town, or a village in full economic expansion with local agriculture or industry being developed. On the other hand, different signs such as a social wasteland or more intensive cultivation of a plot of land may correspond to the same reality: rural depopulation.

Thus it is not a question of analysing the landscape as such, or for itself, but rather of seeing it as an integrated landscape: as an object produced by a whole range of production relationships, economic exchanges and residential constraints, which are in their turn the expression of a well defined economic and social organization. This provides a starting point for an analysis of the essential components of a space such as production, consumption and flow of goods. In short, to reflect on questions of space one needs to take the concrete content and build general structures on it to enable one to interpret a space in terms of interrelations, networks and systems. To reflect on space, one also needs to identify the different lines, starting with simple lines such as the system of co-ordinates or latitude and longitude, and going right up to socio-political and mental references without neglecting the factors linked to economic functions such as flow patterns and networks. To reflect on space one must distinguish between different parts of space according to the superimposition of the different reference marks and lines. By correlation, one might equally say that it is a question of being aware that any given place such as a residential unit, a district of a town, a village or an administrative unit, a county or a region is defined by several spatial reference marks and each individual depends on several spatial reference marks for his work, his leisure activities, his administrative formalities ...

If one is aware of and then masters this differential spatiality one can replace a world picture made up of obvious but false demarcation lines with a picture made up of cohesive units which enable one to understand reality.

Mastering geographical reasoning uses two distinctive methods linked to the specific nature of the discipline. As in the other sciences, one starts with a given situation and identifies the problems, then one works out a suitable approach to problem-solving. For the geographer, these problems are centred around the question of relative location - Where? How many? Why? - and then hypotheses are made and their (relative) validity tested by identifying the parameters and observing the impact of each one. If the hypothesis is not refuted (it can never be fully proved in the scientific sense of the term) reality can be rebuilt to include each hypothesis which is then tested with a view to making a generalization of it.

In summary, the specific nature of geographic reasoning lies in the necessary combination in a system of constituents which depend on many different fields of knowledge. These include biology, earth sciences, moral sciences and social sciences. It also depends on taking into account the different scales of phenomena, a reasoned analysis of the interplay between scales and the comparison of phenomena of the same scale. The linking systems between the different scales are the keystone of geographical reasoning.

The methods of application are many and may be adapted to the problem posed. To reach specific decision about application, it is necessary to map out the spatial configuration of different kinds of cohesive units, such as topographical units, climatic, urban and ethnic units and administrative divisions, and to show that the contents of these units overlap and that their limits, contrary to what former specialists of regional geography believed, do not coincide. The intersections between these units and the interferences between phenomena at the most relevant scales must then be considered. In an everyday context, it is a question of showing that phenomena at any scale can be explained by the analysis of similar phenomena at a different scale.

For example, the search for explanations about the choice of crops on a single farm or a larger agricultural area in Europe inevitably demonstrates the decisive role of market conditions or more precisely, the role of decisions taken in the European Economic Community. To take another example, the organization of urban space into areas with specific functions, each with their own particular style of architecture, can be explained by the absence or application of legislation at national level.

No particular scale should be considered more important than any other. The different facets of urban reality vary and are complementary to each other, depending on whether you observe them on a large scale (taking a block or a district of a town), a medium scale, (looking at a town or a large urban centre) or at a small scale (taking a whole group of major towns). It is thus vital to put oneself at these different scales and work to link up these different observations.

To summarize yet again, the classical notions which have merely been revisited and the new concepts borrowed from other sciences, but which have turned out to be essential to an up-to-date approach to geography, may be contrasted too sharply. One of the traditional ideas which a renewed approach to geography has enriched is the idea of location. Geography has always been chiefly concerned with answering the question "Where?" but it has often been confused with cartography which focusses on locating places, itineraries or specific areas. The concept of location is too often reduced to an idea of geographical situation, whereas it should include the notions of allocation, distribution and specialization.

The up-to-date approach to the idea of spatial influence areas is equally significant. These are spaces which are determined by flow patterns such as continual movement of people, goods, services and information. These flows define areas of influence such as the distribution area of a shop, the catchment area of an urban centre or the area over which a piece of information is transmitted. Therefore, a spatial influence area is an abstract and invisible space which is nevertheless part of the concrete and visible space of a landscape. It is partly materialized by the communications network or the flow of vehicles. It is also a cartographical space in which the map describes the degree of influence, the nature, the quantity and the intensity of the flow patterns.

These flows come from or converge on poles or nodes, thus bringing to our notice the existence of polarized spaces and interlocked spaces. For example, a regional metropolis defines commuter space as the space covered daily by various services over an area of 10 to 30 kilometres. Weekly services will operate over an area of 30 to 90 kilometres, and the overall sphere of the metropolis's influence will extend from 90 to 250 kilometres.

Finally, as a further illustration, it is interesting to turn to the notion of distance and show how it has been enriched. We have moved from an absolute concept of distance (expressed in kilometres) to a relative conception, estimated in terms of time and cost and from there to an approach which links time and cost in terms of their relative importance. For example, it is the subjective attitudes of social actors to distance which decides where they live, where they go shopping and where they spend their leisure time. Their preferences are often at least partly based on mental pictures.

Among the concepts borrowed from the scientific community, the idea of systems is essential. If geography has long intended to use a system analysis approach, its actual application is only recent. It is important to remember that the advantage of a systems analysis approach is that it enables us to discover the "complexity" of reality, since each element is considered as a system which is itself part of a series of systems. Another advantage of this approach lies in the fact that it helps to heighten our awareness of the difficulties of an action by providing us with a tool: the model is a method of creating scenarios.

In considering the contribution of the systems approach to applied geography, we may, firstly, consider the two concepts of "interrelation" and "interaction", which are appreciably different, but which both put the emphasis on the reciprocal nature of actions and substitute for simple cause/effect relationships, a complex casuality which shed a doubt on classical determinism.

We should then consider the idea of "feedback". Positive feedback in a system generates change. Negative feedback guarantees stability.

Another valuable concept is the idea of regulation. This is a complex notion which goes beyond the simple idea of a state of equilibrium and refers to ideas of regulation, maintenance, development and evolution which lead to the system adapting a tendency to change in specific ways.

Finally, the concept of "crisis" is considered. This may be either an internal or external disturbance, in the evolution of a system which leads to a change or a return to a previous level of equilibrium.

It is possible to transpose the concept of systems and systems analysis into the field of pedagogics. Systems analysis is certainly a demanding mental exercise but it is also an invigorating and rewarding approach which encourages the pupil to ask searching questions. It quickly accustoms people to being dissatisfied with a study of objects for their own sake, or at best with a linear establishment of relationships. It encourages them to establish complex relations. Those who are taught learn to ask questions about the whys and wherefores of transformations, to anticipate evolutions, actions and people's interventions by carrying out and thinking through diagrams.

This highly positive presentation of systems analysis should not encourage readers to cherish any illusions. Systems analysis is a tool of indisputable methodological value. It enables one to pose a problem in a relevant way, but it does not, in itself, give the solutions to the problems it sets. At best, it enables one to choose a direction of enquiry, to throw a light on a decision. However, the situation remains to be resolved and this implies choices and decisions which cannot be made automatically or resolved by a naive functional approach.

Geography and the aims of education

Whereas, thirty years ago, decisions concerning the implantation of major industrial sites, the layout of the road network or town planning were all taken by technicians or politicians, nowadays, a growing number of citizens want to take part in the debate of the organization of space. In part at least, space is only intelligible with the help of geography.

Since one of the aims of education is to train people to be citizens, i.e. responsible individuals who will take an active part in the community, they must be given the wherewithal to understand so that they can play an effective part as responsible citizens.

It is all the more important for geography to be of a high quality, open to the preoccupations of modern science and engaged in training people to be citizens, since in primary and secondary education, geography is entrusted (for reasons of institutional organization) with the task of reflecting on the present and providing an initiation to the modern world. The scientific knowledge which is part of the other social sciences (demography, economics, sociology, ethnology) and which is useful if one is to understand contemporary society is only transmitted and understood through the teaching of history and geography. It is therefore vital that this knowledge be integrated into coherent logical developments rather than being juxtaposed without any logical linkup or simply being omitted altogether.

Finally, within the framework of education we should be aiming not only to provide a mass of information which is the product of pedantic erudition, but rather to give a geographical education. Thus, on the one hand we must introduce real geographical methods, while on the other, considering geography as a training ground whose methods and intellectual gymnastics could be of use in other fields of learning and action. There should therefore be no question of putting ourselves in the place of the "taught" and making them learn off-by-heart analyses and judgements for which they are not really prepared. When teaching geography, we should, on the contrary, help our pupils to ask themselves the same questions that geographers ask and which the pupils will have to come to terms with later on in their work or as citizens.

Putting forward this dual view of a geography, which is both authentic and active would seem to go beyond the simple question of didactic transposition. However, this is only an apparent contradiction. Transposition must of necessity take into account the institutional context of the education system.

Practical implications and institutional consequences

The enumeration and definition of the contributions of epistemology to didactic reflection leads the writer to make several suggestions.

Firstly, it seems essential to revisit the subject matter proposed in the syllabus. In spite of a few timid proposals in the Official Instructions for French Primary Schools, teachers' weak understanding of the contents of the geography syllabus does not permit them to develop a sufficiently complex problem structure for the set themes. Analysis of the natural constraints resulting from the use of space by people should be replaced by a "plural" approach taking into account:

- the spatial dimension (location, space or spatial influence areas),
- the temporal dimension (the historical evolution and its rhythms)
- economic and social factors (flow pattern of property, people, information, status and social relationships) and
- the anthropological dimension (in particular mental pictures of people involved in the situation).

Secondly, it would probably be useful to diversify in the contents of the syllabus. It is essential in geographical reflection to use all the different scales and to examine the possibility of paying particular attention to certain scales for certain subjects at different levels of the curriculum, without at the same time, neglecting the relationship between the different scales.

It is not easy to succeed in these tasks since it is not so much a problem of understanding and accepting new ideas as escaping from former ideas and practices. Efficient levers within the educational structure to accelerate these changes include in-service training for teachers. Initial and in-service training are vital if one wants teachers to keep up with advances in knowledge and if one wants teachers to be able to master their objectives and adapt their pedagogical approach to mixed ability classes.

Finally, research in didactics is a vital complement to in-service training. Any teacher-training worthy of the name must constantly draw new strength from research findings. Such research is currently being undertaken at the I.N.R.P. in Paris by M. Lucille Marbeau.

ACKNOWLEDGEMENT

The writer would like to acknowledge the work of J. Maizener (in collaboration with L. Marbeau) in translating this paper.

30: GEOGRAPHY IN THE PRIMARY CURRICULUM: USING THE WORLD'S SCHOOLS TO PROMOTE EMPATHY

Bill Marsden

This paper suggests how schools themselves can be used as a means of promoting empathy (Blyth et al. 1976: 26) in primary school geography. The question of whether this should be pursued through a subject-centred approach or the more integrated framework of world studies (Fisher and Hicks, 1985) is side-stepped (Storm, 1983: 138-9). A strong case can, of course, be made for geography as an under-pinning for world study (Cogan and Nakayama, 1985: 48-52). An underlying assumption is that welfare geography should be a component in the primary school curriculum (Clark, 1979; Bale, 1987: 95-101).

While in the 1960s Carnie (1966) drew attention to the complex inter-relationship between the cognitive and affective aspects of the development of attitudes, much work since on promoting empathy has tended to limit it to the affective domain. Trying to attract children to a humanist set of attitudes is difficult since pedagogic criteria may run counter to what might be regarded as the most appropriate procedures for preempting unfavourable stereotyping and promoting empathy. It should not be too readily assumed that the various factors which have to be taken into account in curriculum planning point conveniently in the same direction (Marsden, 1984).

In the primary phase the following pedagogic principles are frequently applied:

1. Move out from the familiar to the unfamiliar;
2. Start with the simple and the concrete; and
3. Begin with straightforward concepts and gradually refine them.

Sound as these principles may be, some caution is needed. In moving out from the familiar to the unfamiliar, there is the danger that delayed decentration may serve to reinforce egocentricity at the individual level and ethnocentricity at the group level.

Furthermore, in starting with the simple and the concrete and in striving to make sense of a complex world, teachers may break it down into more clear-cut elements than exist in reality. This necessary simplifying process inevitably generates distortions.

Finally, while beginning with straightforward concepts and gradually refining them, it must be realised that this process involves fragmenting into categories, and arranging in rank orders. From such procedures can spring revealing generalisations, but debased generalisations are of course stereotypes (Marsden, 1976: 228-30). The more gross the contrast, the easier it is to comprehend the distinction but in the affective frame this can provoke judgmental "them" and "us" contrasts (Bruner, 1966: 93-4). Unfavourable stereotypes are grossly contrasted.

Geographical paradigms can in themselves generate environmental and social stereotypes. Thus the so-called "main-land" tradition, as filtered through Herbertson's "natural regions", both provoked deterministic notions of hostile environments, and also highly stylised and detached views of people and places.

Equally, the child-centred tradition itself, in setting the child at the centre of the stage, with autonomy the desired end-product, has often regarded preparation for facing the adult world as undesirable. It has been argued that the progressive ideology cocoons the child from society and its problems (Alexander, 1984: 18-9), inhibiting an early acquaintance with social problems such as unequal opportunities for girls and boys (Darling, 1986: 31-40). At the other extreme, efforts to redress the balance and confront children early with the forces of economic exploitation, social injustice, political oppression and ideological struggle can generate an alternative set of stereotypes too easily condemned by certain right-wing interests as indoctrinatory. In "teaching geography for a better world" (Fien and Gerber, 1986) a more consensual approach might usefully be sought through a broad interpretation of human rights education (Starkey, 1986: 57-66).

Implementation

An anomaly which this paper seeks to redress is that rarely in the literature on welfare or radical geography, world studies, development education, or human rights education, is schooling identified as a significant subject of geographical enquiry. It is not ranked, for example, as a key issue of global study in teacher education (Hicks, 1982: 121). At best, schools appear incidentally in a topic web (Richardson, 1976) a detailed curriculum statement (Selby, 1982: 61-2), or a checklist (Fisher and Hicks, 1985: 177). This neglect is puzzling, as there would seem major advantages in making schools a central topic, in historical, geographical and social terms, in world studies. What are these advantages?

1. In taking a concentric approach (Masterton, 1969) to world study, nothing could be more familiar and real as a starting point, apart from the home, than the school, and the journey from home to school.

2. The school is the actual place of work of children. Much curriculum material reflects the interests of adults: the world of adult work and political preoccupations. Schools are part of the everyday, integral experience of children all over the world. Not all topics in welfare geography are similarly so.

3. Additionally, the school and its physical, cultural and political situation constitutes particularly good geographical material at a number of levels, as Figure 30.1 illustrates.

Case studies and sources

One reason why schools and educational issues may have been marginalised in the literature of geographical and world studies education is the obvious one of lack of access to source materials. There may be no problem with the initial material related to the local school. Certainly in Britain there are sets of excellent texts at the primary level detailing how to use it, such as the *Outset Geography* series (Catling et al, 1981-4), *Mapstart* (Catling, 1986), and *Going Places* (Renwick and Pick, 1979) and, for travel to school, *Into Geography* (Harrison et al, 1986).

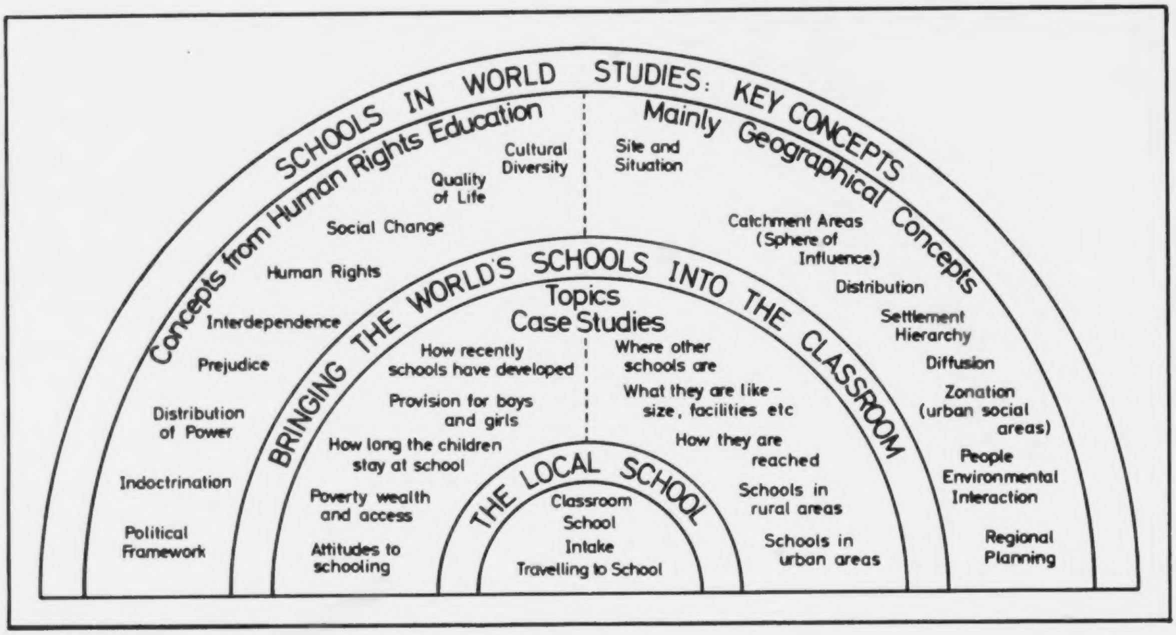

SCHOOLS IN WORLD STUDIES: KEY CONCEPTS
Concepts from Human Rights Education
Mainly Geographical Concepts
Cultural Diversity
Quality of Life
Social Change
Human Rights
Interdependence
Prejudice
Distribution of Power
Indoctrination
Political Framework
Site and Situation
Catchment Areas (Sphere of Influence)
Distribution
Settlement Hierarchy
Diffusion
Zonation (urban social areas)
People Environmental Interaction
Regional Planning
BRINGING THE WORLD'S SCHOOLS INTO THE CLASSROOM
Topics
Case Studies
How recently schools have developed
Provision for boys and girls
How long the children stay at school
Poverty wealth and access
Attitudes to schooling
Where other schools are
What they are like - size, facilities etc
How they are reached
Schools in rural areas
Schools in urban areas
THE LOCAL SCHOOL
Classroom
School
Intake
Travelling to School

Figure 30.1. A framework for the study of schools in geography and development education

a) The local school provides opportunities for developing skills of graphicacy through plans of classrooms, school buildings and playgrounds, moving on to more dynamic processes such as movement about the school and journeys to school. Studies of pupil intake also serve to connect the school with its local environment and community.

b) The world's schools can be brought into the classroom as case studies by visual and other means, illustrating the various geographical and human welfare themes to be considered.

c) These exemplars should be placed by the teacher within a framework of key concepts, both specifically geographical, and more generally related to development or human rights education.

Much less accessible is comparable case study material related to more distant environments. Not the least difficulty is finding the requisite information base. Even at the frontiers of knowledge the geography of education remains a relatively neglected area, despite some early proselytisation by the International Geographical Union (Hones and Ryba, 1972: 135-9). There is, however, some good material on the developing world, including that by Brock (1976) and particularly by Gould (1975, 1978 and 1982) which may be obtained through regional library networks. Gould's work is potentially excellent background material on aspects of the geography of education in tropical Africa.

More accessible are macro-level materials, in which education is used as an index of social welfare, provided by official and voluntary aid bodies. These include such indices as literacy levels and enrolments in the different phases of education (UNICEF, 1985: 118-9; World Bank, 1986: 26-7). They illuminate vital key concepts, such as the distribution and diffusion of schools over the world, disparities in educational opportunity, not least with respect to gender differences, education as an index of the quality of life, and the relation of education to demography. In almost all of Africa, South and South-east Asia, and much of Latin America, for example, over 50% of the population is aged eighteen years and less, putting immense strain on the budgets of poor countries to provide universal schooling. Though designed for a more advanced level than that of the students considered in this article, Morrissey's study for sixth-forms of educational disparities in the Caribbean is almost unique (Morrissey, 1985: 56-60).

To investigate quality in addition to quantity of provision, and to allow children to look at the similarities and differences between what is offered in prosperous countries and what is available to most children of the world, however, more case study material is needed. The following photographs and the agendas they cover give a mere flavour of what can be provided.

Figure 30.2 is a picture of a large late nineteenth-century London elementary school in a setting of social deprivation, just to the west of Paddington station. People at the time were excited by the symbolic character of these schools, standing above the dingy terraced streets, "carrying high the flag of education" (Booth, 1891: 129). However, the land required for such schools and for the railway tracks in the foreground were major causes of demolition of housing and the disruption of communities. A grid of questions can be attached to such a photography but it would of course be even more productive to link this with other material including plans of the school, large scale local maps, and registers, to allow the plotting of homes of scholars and the delineation of catchment areas.

Figure 30.3 takes us to a completely contrasted environment, though one that has also undergone radical social change. It is in a rural area in the mountains of the Vorarlberg province in the west of Austria. In the background, hardly visible, is the building of the tiny former one-class school of the mountain hamlet of Sonntag-Stein. Before the coming of the cable car, children would have found it impossible to plough through winter snowdrifts to reach the school in the main village of Sonntag, in the valley below. The tourist cable car which opened up the ski-slopes also closed the old

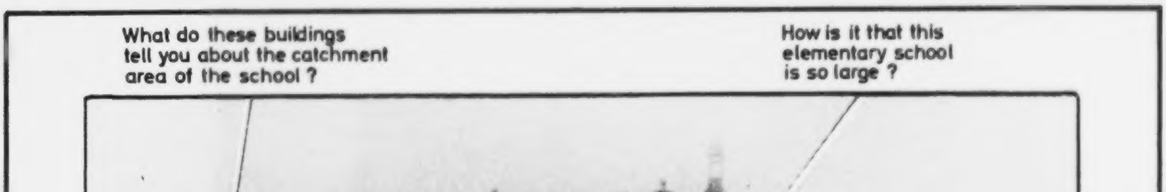

What do these buildings tell you about the catchment area of the school ?
How is it that this elementary school is so large ?
Why where there high walls built around the school ?
How might the railway tracks have affected the school and its catchment ?

Figure 30.2 An old elementary school in London, England. (Photo, courtesy of G.L.C record library)

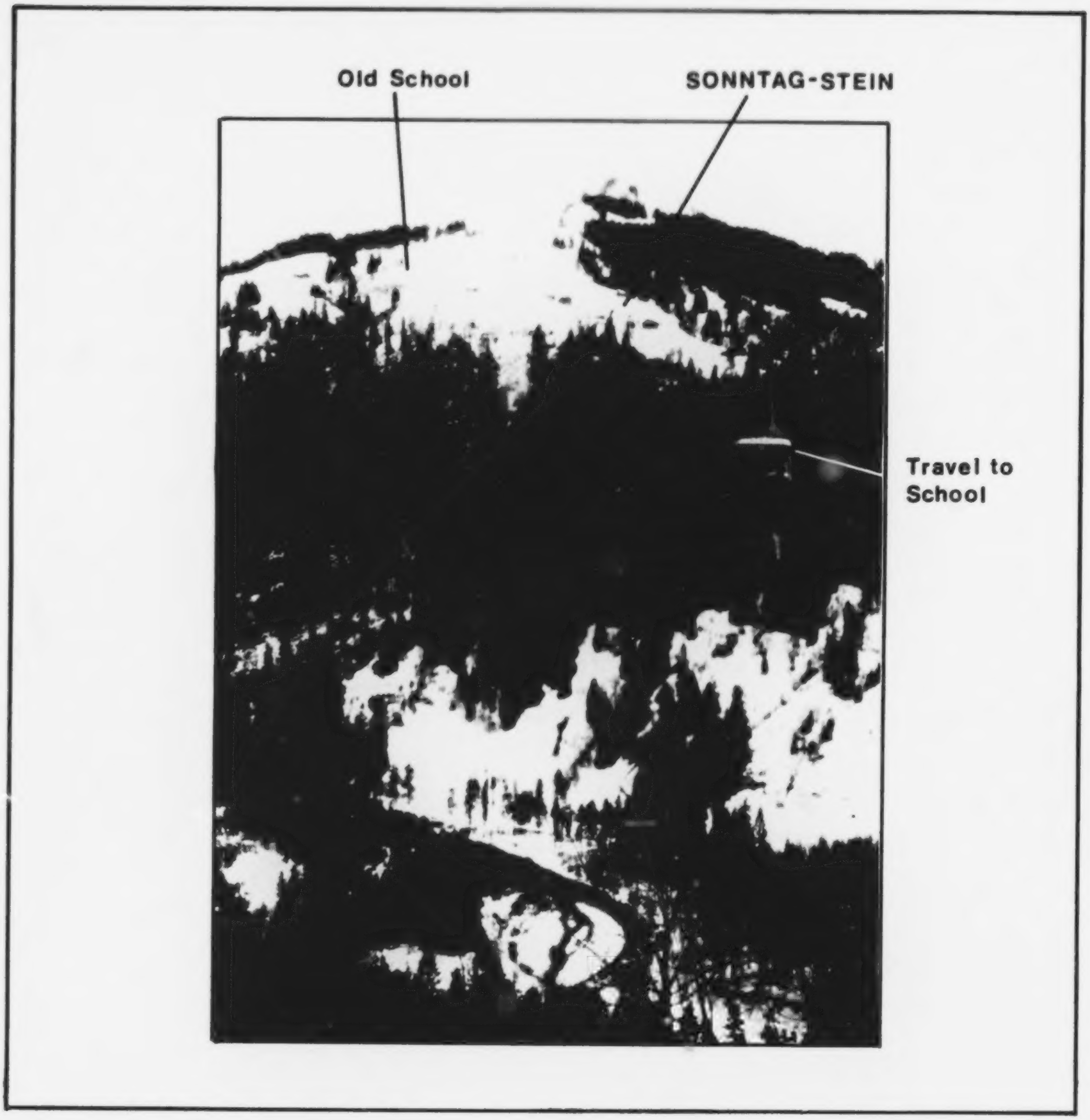


Figure 30.3 Education in the Vorarlberg, Austria

school in Sonntag-Stein, for it provided transport for the hamlet's few children. One of them is the sole passenger in the cable-car shown, on her way to afternoon school in Sonntag.

Behind this information lie important policy issues for rural education (Meusburger, 1974). Village schools are focal to the social life of their communities, yet these communities do not generate enough children for effective educational provision, by the standards expected in the towns and favoured by central government. In many Vorarlberg villages, the traditional primary provision is in a room or two of a multi-purpose building such as the one shown in Figure 30.4. When the photograph was taken this building housed a one-class school, the teacher's flat, the post office, a store, and the village hall.

Figure 30.5 is obviously an urban school, located in this case in the ring of working class housing which surrounds the city centre of Munich. The school, Agilolfinger Street, a typical Bavarian urban school building, is now run as a Greek school. Munich is the home of many guestworkers from southern Europe. Schools such as this epitomise another type of educational disparity - the unequal opportunities offered to ethnic minority children, here and elsewhere in Western Europe. Should they be educated for integration into the local culture, or should they maintain their national identity to facilitate a return

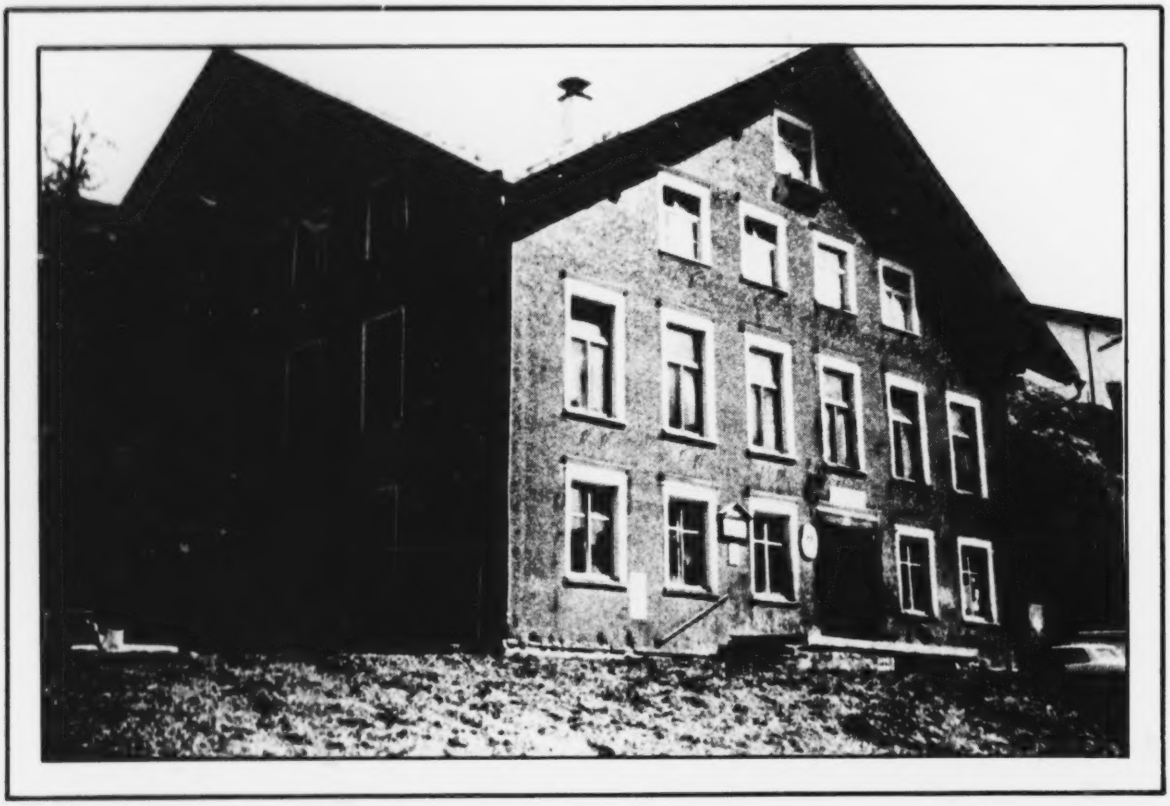


FIGURE 30.4 Multi-purpose school building, Sankt Gerold, Vorarlberg

to the country of their parents? It must be remembered that large numbers of these children were born in West Germany. At the Greek school, national identity is given priority and the children are taught in Greek. In other schools in Munich, the children of guestworkers are taught in German.

Again, a range of relevant educational policy issues is raised, including the problems of relating school location, and transportation of children to school, to segregated social areas in the city (Geipel, 1986). The research undertaken by Geipel into these problems is one of few examples to have been translated into curriculum materials for schools, in this case secondary schools in West Germany (Birkenfeld, Geipel and Jungfer, 1978).

In many countries of the developing world, school provision is lacking both in quantity, and even more in quality. Much more visual material is required to illustrate the different conditions under which the developing world's children are schooled. Thus in parts of East Africa we might find a thatch construction with crude wooden benches standing on the bare earth; in the deserts of West Pakistan an open air school, a bare brick shack acting as a "school" in a Calcutta bustee and teachers taking children of all ages in a one-class Ethiopian rural school (Marsden, W.E. and V.M., 1983 and 1986). Figure 30.6 is a picture of a Nigerian school, re-roofedfollowing damage in the Civil War, with several classes sharing the space. The few desks were supplied by UNICEF, who also did the re-roofing and supplied text books.

Conclusion

A graded scheme of work based on the geography of education is a potentially valuable means of combatting stereotyping and developing empathy in primary school geography and beyond. Such a scheme should be concentric and include:

1. Graphicacy studies of the school itself, and more socially-oriented work on the school catchment area.
2. Case studies from different environments designed to explore similarities and differences between -
   a) schools in physically dissimilar locations;
   b) rural and urban schools;
   c) schools in different cultural settings;
   d) schools in areas of differing socio-economic levels of comfort and proverty.

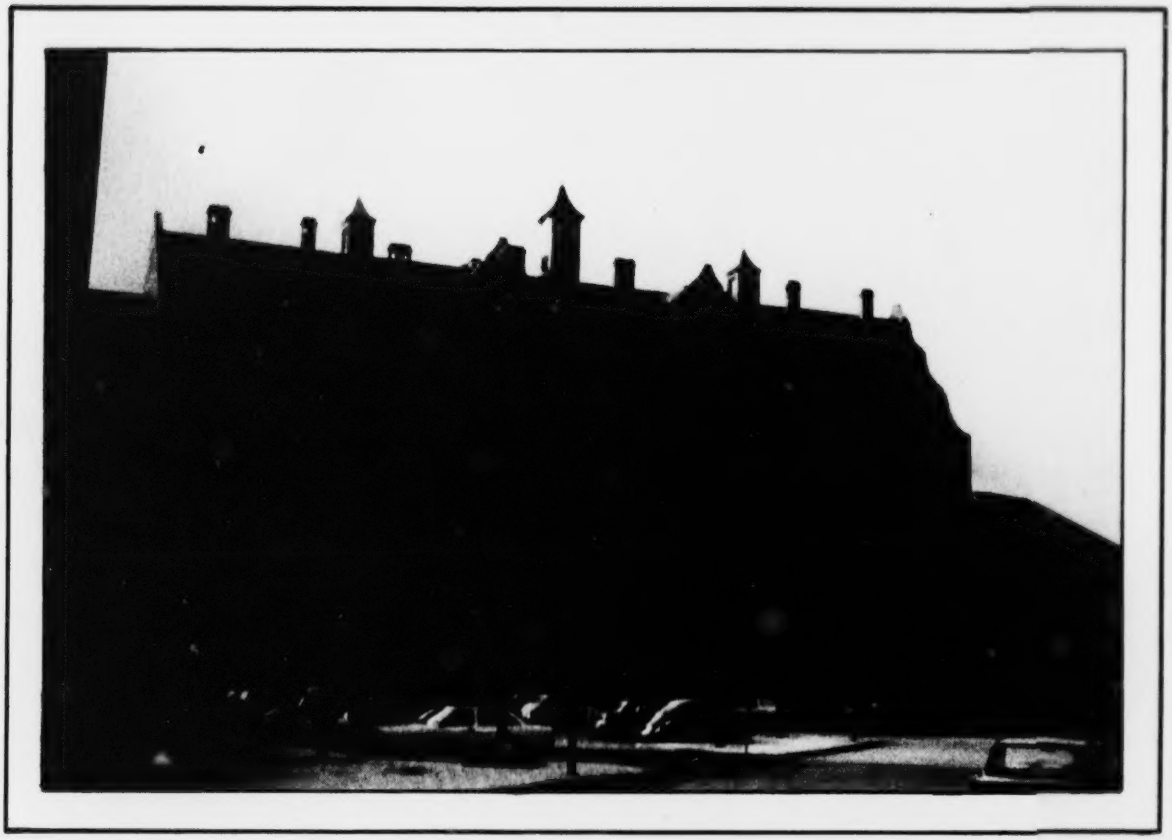


Figure 30.5 The Greek school, Munich

3. All this to be set within a conceptual framework which allows the refinement of relevant concepts drawn from geography and human rights education which might over time foster the balanced and differentiated thinking which has a critical role to play in inhibiting acceptance of unfavourable stereotypes, and in promoting empathy.

For this to be implemented, case studies of schools from all over the world must be made available. These should ideally include photographs taken both inside and outside the school, and of its physical, demographic, economic and cultural setting; associated plans and maps; preferably some information from the school register; details of lengths of stay at school and levels of achievement reached; and of the curriculum followed. This could be done through school exchanges (Walford, 1985: 28-9). Salahie (1987) has described a school twinning arrangement, though this relates to environmental awareness promotion and not to providing specific information about the school. Obviously, there are also possibilities of progress through international organisations. Thus the Commonwealth Linking Trust, and Voluntary Service Overseas might be asked to help. For the International Geographical Union's Commission on Geographical Education there might also be a challenge. Could it take a hand in using its wide range of contacts to produce, perhaps through a future publication, the kind of case study materials that are so critical to the success of such welfare geography exercises?

REFERENCES

Alexander, R.J. (1984) *Primary Teaching*, London, Holt, Rinehart and Winston, 18-19.

Bale, J. (1987) *Geography in the Primary School*, London, Routledge and Kegan Paul.

Birkenfeld, H., Geipel, R. and Jungfer, H. (1978) *Gastarbeiterkinder in einer Deutschen Grosstadt, Munich, Raumwissenschaftliches* Curriculum-Forschungsprojekt, 11.

Blyth, W.A.L. et al, (1976) *Place, Time and Society 8-13: Curriculum Planning in History, Geography and Social Science*, Glasgow/Bristol, Collins/ESL.

Booth, C. (1891) *Labour and Life of the People: East London*, Vol. 1 London, Williams and Norgate, 129.

Brock, C. (1976) "A role for geography in the service of comparative education", *Compare*, 5(3), 35-6.

Bruner, J.S. (1966) *Toward a Theory of Instruction*, Cambridge, Mass., Harvard University Press, 93-4.

Carnie, J. (1966) "The development of national concepts in junior school children", in Bale, J., Graves, N. and Walford, R. (1973) *Perspectives in Geographical Education*, Edinburgh, Oliver and Boyd.

Figure 30.6 A school room in Nigeria (Photo by Alasdair Matheson courtesy of UNICEF)

Catling, S., Firth, T., and Rowbotham, D. (1981-4) *Outset Geography*, 5 vols, Edinburgh, Oliver and Boyd.

Catling, S. (1985) *Mapstart*, 3 vols, London, Collins-Longman.

Clark, B. (1979) *The Changing World and the Primary School*, London, Centre for World Development Education.

Cogan, J.J. and Nakayama, S. (1985) "The role of geography in developing international understanding", *Social Education*, 49 (1), 48-51.

Darling, J. (1986) "Child-centred, gender-centred: a criticism of progressive curriculum theory from Rousseau to Plowden", *Oxford Review of Education*, 12(1), 31-40.

Fien, J. and Gerber, R. (1986) *Teaching Geography for a Better World*, Brisbane, Australian Geography Teachers Association, The Jacaranda Press.

Fisher, S. and Hicks, D. (1985) *World Studies 8-13: A Teacher's Handbook*, Edinburgh, Oliver and Boyd.

Geipel, R. (1986) *Schools, Space and Social Policy: Educational provision for the Children of Migrant Workers in Munich*, Liverpool University Press, International Monographs in Community and Educational Policy Studies No. 1, 1-40.

Gould, W.T.S. (1978) *Guidelines for School Location Planning*, Washington D.C., The World Bank, 103.

Gould, W.T.S. (1982) "Provision of primary schools and population redistribution", in Clarke, J.I. and Kosinski, L.A. (eds.) *Redistribution of Population in Africa*, London, Heinemann, 44-9.

Harrison, P., Harrison, S., and Pearson, M. (1986) *Into Geography: the Geography of the Environment*, 4 vols, Leeds, Arnold-Wheaton.

Hicks, D. (1982) "Global issues in initial teacher education", in Hicks, D. and Townley, D. (eds.) *Teaching World Studies: an Introduction to Global Perspectives in the Curriculum*, London, Longman, 117-130.

Hones, G.H. and Ryba, R.H. (1972) "Why not a geography of education?" *The Journal of Geography*, 71(3), 135-9.

Marsden, W.E. (1976) "Stereotyping and third world geography", *Teaching Geography*, 1(5), 228-30.

Marsden, W.E. (1984) "Paradigms, pedagogics, politics and some problems of stereotyping in school geography in Haubrich", H. (ed.) *Perception of People and Places through Media*, Vol. 1, Freiburg, Padagogische Hochschule/International Geographical Union.

Marsden, W.E. and V.M. (1983) *World in Change*, Edinburgh, Oliver and Boyd, 216-7.

Marsden, W.E. and V.M. (1986) *World Concerns*, Edinburgh, Oliver and Boyd, 28.

Masterton, T. (1969) *Environmental Studies: a concentric Approach*, Edinburgh, Oliver and Boyd, 47.

Meusburger, P. (1974) *Bildingsplanung in Osterreich: Band 3 Landes - Schulentwicklungsplan von Voralberg*, Vienna, Osterreichischer Bundesverlag fur unterricht, Wissenschaft und Kunst.

Morrissey, M. (1986) "Mapping educational disparities in the Caribbean", *Teaching Geography*, 10(2), 56-60.

Renwick, M. and Pick, B. (1979) *Going Places*, 4 vols, London, Nelson.

Richardson, R. (1976) *Learning for Change in World Society*, London, World Studies Project.

Salahie, R. (1987) "Kenya - UK school twins", *Green Teacher*, 4, 20-1. I am grateful to Wynne Stumpe, of the World Development Studies Centre at Liverpool Institute of Higher Education for this reference and advice of school links.

Selby, D. (1982) "World studies and the curriculum", in Hicks, D. and Townley, C. (eds.) *op.cit.*, London, Longman, 59-62.

Starkey, H. (1986) "Human rights: the values for world studies and multicultural education", *Westminster Studies in Education*, 9, 57.

Storm, M. (1983) "The geography curriculum in the 1980s", in Huckle, J. (ed.) *Geographical Education: Reflection and Action*, Oxford University Press, 132-42.

UNICEF (1985) *The State of the World's Children - 1985*, Oxford, University Press, 118-9.

Walford, R. (1985) *Geographical Education for a Multicultural Society*, Sheffield, Geographical Association.

World Bank (1986) *The World Bank Atlas 1986*, Washington D.C., The World Bank, 26-7.

31: AN APPROACH TO THE INTEGRATION OF GEOGRAPHY AND HISTORY: FINDING A PLACE FOR GEOGRAPHY IN THE K-12 CURRICULUM

Christopher Salter

One of the most common laments of the geographer is the cry of anguish as he or she learns how little geography there is in the contemporary American pre-collegiate curriculum. The only cry that rings louder than that, is the response to the wounds that are gained as one tries to find a niche for geography in that same curriculum. In trying to understand the source and explanation of these wounds and cries, one learns the three Laws of Curriculum Reform.

The first law is "The Law of Relentless Fullness". This is the simple observation that everyone who has worked on curriculum is convinced that although there is assuredly need for a better and more balanced curriculum, there is no room in the current draft to add anything without there being a bitter battle by some threatened discipline's representative. This means that every attempt to bring a new subject in or a traditional subject back is accompanied by intense competition for space. It is a geographical exercise at its most basic level.

The second law that becomes apparent is "The Law of Diminishing Resistance". If one decides to proceed, notwithstanding the Law of Relentless Fullness, and attempt to add some geography to the curriculum in question, this second law becomes operative. The Law of Diminishing Resistance states that if issues in the utility of geography are continually brought to the forums of educational change, with quiet but persistent counsel on the beneficial nature of the geographic perspective, people tend to begin to think about such a change in the curriculum in a more positive way.

Diminishing resistance leads to the third law. This is the "Law of Creative Infusion". The dynamic of this law is driven by the need to wed geography to accommodating disciplines so that curricular change may be achieved without massive and disruptive replacement of one discipline by another.

It is the essence of these laws that drives this paper.

The law of creative infusion

In response to this third law, the geographer learns quickly that the most logical partner for creative infusion is history. Not only is it the discipline that has the most fundamentally geographical questions to ask, but it is also the basis of the social studies curriculum in American schools. In that role, history makes the perfect partner for a significant and stimulating blending of questions, themes, learning outcomes, and creative thinking. It lends itself well to geographical infusion.

To most geographers and particularly to cultural geographers the concept of infusion is too basic to even argue. Every intellectual question asked by such geographers is a union of geographic and historical factors. For example, "What role did geography play in the Dust Bowl of America in the 1930s?" is a question that demands understanding of the historical patterns of land use, land tenure, farming technology, and demographic shifts.

"How was geography influential in the British decision to utilize Australia as a penal frontier?" requires comprehension of 18th Century distances, patterns of contemporary environmental perception, and historical modes of dealing with criminals and debtors in England. The two disciplines are inevitably linked.

There is no geography without history. And if history is to be taught well, it must be complemented by geography at all levels of instruction. It is this reality that makes the Law of Creative Infusion responsive to the blending of these two disciplines. If one is to find a secure place for the return of geography to the American curriculum, it should be a configuration of geography and history from the outset. Creative infusion can also set the stage for the much-desired return of free-standing, independent geography courses in the precollegiate curriculum.

The involvement of the Geographic Alliance in curricular change

The model that is being used for this paper is the attempt by the California Geographic Alliance to secure space for solid geographic instruction in California during the past four years (Salter, 1986, 1987). There could be no creative infusion if there were no change. California, like virtually all other states, turned its attention to the secondary curriculum in the mid-1980s because of the publication of reports that decried the lack of rigor in public education. A Nation at Risk was one of the most effective and widely read of these laments (Gardner, 1983). Since its publication came at about the time that California elected a new State Superintendent of Public Instruction, the demands for change were felt particularly strongly.

The Hughes-Hart Educational Reform Bill was passed by the California Legislature in 1983. This legislation not only put new monies into the education system of California, but it set the tone for an entirely new climate for educational change. It also mandated that three courses be taken before graduation, and two of them presented an excellent opportunity for the creative infusion of a substantial geographical component.

The basic courses that opened the door for more geographic influence to be felt in the California curriculum were a 9th or 10th grade course called "World History, Culture, and Geography," and an 11th grade course, "United States History and Geography". The third course to be mandated was "American Government, Civics, and Economics".

The titles of the former two courses make it sound as though geography would logically be included in the curriculum, but it is important to realize that the "Law of Relentless Fullness" tends to encourage teachers to pay only minimal lip service to the geography in the title of a course, while spending all their time and energy on history--a field they probably better understand. The task of the Alliance was to make every effort to see that bona fide geography was not only built into the curriculum guidelines, but also made available to teachers as they gained new training for instruction in the themes and concepts of the revised curriculum.

To achieve this goal, the Alliance worked as a group of classroom teachers from grades 6-12, college and university geographers, educational administrators, and some students and parents. We determined that there were three goals we had to achieve if we were going to see geography introduced into the California curriculum and be able to begin to train teachers to teach this new content.

1. A Geographic Alliance presence in the state.

The first goal was to let the state educational cummunity know that geography and geographers intended to play some role in the educational reform that was going on in the state. We decided that the best way to create some visibility was to submit requests for panels, open forums, and paper presentations at state and regional meetings. For these presentations we had six or seven people at junior high, high school, community college, and university teaching levels. We also had two very articulate and interested education administrators from the State Department of Education.

In various combinations, we presented at state geography meetings, state social studies meetings, regional geography meetings, and numerous meetings of principals, superintendents, and administrators. The message we presented in the great majority of these talks was: "Geographers at all levels want to become involved in this process of educational change. Let us participate in the review and rewriting process. Let us show you that we stand ready to develop materials that will demonstrate the ways in which history-social science classes can be made more effective if they have a strong geographic perspective within them".

Although our numbers were not particularly large--we seldom had more than 40 people at an Alliance meeting--we began to gain some of the hoped-for visibility because of the unusual union of classroom teachers and university professionals working together in a volunteer way. By the end of our first year (1984) we had gained the image of spokespeople for a discipline that was largely missing from the California curriculum, and one which ought to be included in the next generation of curriculum documents.

2. Becoming involved in the actual writing of curriculum

The second goal of our group was to involve ourselves in the actual tasks of curriculum review, discussion, and writing. This was--and continues to be--the most critical step in this process of returning geography to some role in any curriculum. We were assisted in this because the head of the State Department of Education History-Social Science Division selected an Alliance member to co-chair the State Advisory Committee on new curriculum guidelines for that field. This stroke of good fortune occurred because of the nature of the meetings our Alliance had run--people from many teaching levels and backgrounds interacting around substantial themes in education.

The co-chair role meant that Alliance members were actively involved in the review of the new curriculum. It allowed them to play roles in the open hearings that reviewed the changes that were being written into the state's educational guidelines. It also meant that, for the first time in decades, teachers at all levels were looking for ways to bring geography into their classrooms. While no teacher is particularly eager for changes in the curriculum, geography as a discipline has many friends because of its supportive role in good history instruction. For that reason we were able to introduce substantial and fundamental themes to the mandated courses. This led to our third goal.

3. Teaching teachers to teach more geography

Because of the erosion of the position of geography in the American curriculum in the past decades, there are few teachers in the school systems now who have prepared themselves to teach this subject. Where geography is offered in a school district, it is more often than not taught by someone who has little or no educational training in the field. In a United States Senate Hearing in Washington, D.C. on October 29, 1987, it was pointed out that "less than 10% of those who teach geography have majored in the subject".

The Alliance saw that it had had some success in getting the state curriculum to call for more instruction in geography as will be shown below but there had been no provision for bringing the content of this new curriculum to the minds and lives of the classroom teachers. It was decided to create a summer geography institute at the University of California, Los Angeles in 1985. To make such a session distinct from other Summer Sessions classes, the entire syllabus was created around the new language of the Model Curriculum Standards of the state. These Standards were the guidelines that were going to drive the process of curriculum reform for the next decade, and they had a rich geography expressed in their content (The Geography Scroll, 1987).

The institute was co-taught by two university geographers and a high school teacher. The flow of daily activity was the presentation of geographic content that came directly from the new curriculum in the morning hours. The afternoon hours were given over to the demonstration of teaching strategies that related specifically to the morning's content. The design of this day was driven by what we called our "Monday 8.00 a.m. Rule". That meant that everything that we taught should have classroom utility so that a teacher could take the content and the associated teaching strategies into the classroom the next Monday and begin a productive teaching session. This rule made the entire pitch of the institute quite divergent from an orthodox geography class at the university.

Creative infusion and the broader stage for change

If members of the Alliance had had the power to shape the world in the way they wanted, the curricular change with which we have been involved would be characterized by at least one and perhaps two years of solid geography in the K-12 curriculum. The fact that we now have geography written into the new California State Framework in grades 5 through 11, and considerable geographic content in grades K-4 brings everyone certain satisfaction, but not as much as the firm establishment of compulsory year-long courses taught by well-educated and trained geography teachers. However, the Law of Relentless Fullness has denied us that possibility for the time being.

Our efforts at creative infusion have been useful in that they have helped us to see what curricular allies we have in teachers of history and the social studies. In our dream of dreams, those teachers themselves might soon wish to see solid free-standing geography courses taught in the future so that every student enters the high school years with a firm understanding of the five fundamental themes and of the importance of spatial concerns in all aspects of education.

At present, our best example of creative infusion is the Geography Scroll. We have incorporated three different efforts into that curriculum document and each of them is axial to success in the Alliance's geographic education program.

The Geography Scroll

When the Alliance finished its work on California's Model curriculum Standards in 1985, it became apparent that some sort of document had to be created. The State Department of Education produced a comprehensive book of guidelines on the language of the new Standards (Model Curriculum Standards, 1985). Something was needed for geography. It was at this point that the Scroll was designed.

The major information on this 9 inch by 40 inch two-sided sheet of paper is the listing of the geographic themes included in the new curriculum. Our first goal, then, was to create some expression of this change that a teacher would want to read, think about, and perhaps pin up on a classroom wall.

The second goal was to relate the twenty-nine themes to the orthodox subfields of the discipline of geography. This was done so that teachers and students alike could see that the content of their newly required curriculum did not develop in a vacuum, but that the ideas and themes had been derived from a vital and broadbased discipline. These subfields were made the central core of the Scroll.

The third aspect of the Scroll was the illustration of the relationship of the curriculum and the geographic subfields to the five fundamental geographic themes. These are the themes that were developed in *Guidelines for Geographic Education* (1984) and have been widely adopted by textbook writers, television producers, and educators working with geographic curriculum.

Thus, the face of the Geography Scroll creates a mosaic of interrelationships between these various lines of geographic thought.

They are all related to nine cartoons intended to attract students to the wall to explore the informal educational message created by a cartoonist from *The New Yorker Magazine*. The themes are also presented as nesting within two broad realms of geographic observation and geographic analysis.

The ultimate utility of the Scroll has been to present on one piece of paper the logical relationship of dominant themes in the two major courses that can accommodate geography in the American K-12 curriculum: U.S. History and Geography, and World History and Geography. In addition, the reverse side of the Scroll has the full explanation of the five fundamental themes taken from the *Guidelines*. The Scroll has been used actively in all the institutes that the Alliance has been involved in, and in countless workshops at which efforts are made to show the pathways of creative infusion of geography into a history curriculum.

The expansion of the Alliance model

After a year and a half in the quest for these three goals--greater visibility, curriculum writing, and teaching the teachers--the Alliance found itself the focus of some interest by the most powerful geographic force in the

United States. President Gilbert M. Grosvenor of *The National Geographic Society* and his Chief Geographer, Dr. Barry Bishop, have been looking for a mechanism that would allow the Society to assist in the return of geography to American schooling. Because the Alliance was based at the state level, and because it represented a collaboration of the energy and need of classroom teachers with the content and professionalism of academic geographers, the Alliance was selected as the model for the Society's broad scale involvement in educational reform.

Now after two and a half years of support by the Society, the Alliance Network has grown to cover 21 states and the District of Columbia. In a speech to the annual meeting of the National Council for the Social Studies, President Grosvenor noted that the Society has invested more than $10,000,000 in various facets of its expanding Geography Education Program, and has dedicated itself to support the enhancement and expansion of geography education for a decade (November 16, 1987).

Critical to the financial demands of such a program will be the expansion of the program to include other funding partners. One example of the initial success of this partnership concept is shown by the fact that the Society contributed $680,000 for Alliance institutes and conferences in the summer of 1987, and another $686,000 in cash and in kind was provided by state departments of education, legislatures, governors' offices, universities, and private foundations.

Conclusions

The Three Laws of Curriculum Reform taught the Alliance that creative infusion, i.e. wedding geography with a strong and accommodating classroom subject such as history, was the most likely way to find a place for the discipline of geography in the current American curriculum. The force that led to the achievement of such infusion was the Geographic Alliance, initially begun in California in 1984. The outcome of three years of active work in educational reform in that state is current participation in the development of a new State Framework for History-Social Science that has more geography written into the requirements of state education than the state has known for six decades. That work was achieved by a collaborative of classroom teachers, geographers, and educational administrators.

The model of that collaborative--the Geographic Alliance--was taken by the National Geographic Society and used as a central part of a major program of public information, materials generation, teacher training, and educational reform. As a result of the work of the Society--and parallel efforts funded and directed by the Association of American Geographers, The National Council for Geographic Education, and The American Geographical Society--the American public has more geography on its mind that it has thought of in decades.

The combination of creative efforts to blend geography with history in the reshaping of the K-12 curriculum and the professional and far-reaching impact of The National Geographic Society has given geographers in the United States an optimistic sense that we will find a place for geography in the K-12 curriculum.

REFERENCES

Department of Education (1985) *Model Curriculum Standards: Grades Nine Through Twelve*, Sacramento, California State Department of Education.

Gardner, David P. (1983) *A Nation at Risk: The Imperative for Educational Reform*, Washington, D.C., U.S. Government Printing Office.

Joint Committee on Geographic Education (1984) *Guidelines for Geographic Education: Elementary and Secondary Schools*, Washington, D.C., Association of American Geographers.

Salter, Christopher L. (1986) "Geography and California's educational reform: One approach to a common cause", *Annals of the Association of American Geographers*, 76(1).

Salter, C. (1987) *The Geography Scroll*, Los Angeles: Center for Academic Interinstitutional Programs, UCLA.

Salter, C. (1987) "The nature and potential of a geographic alliance", *Journal of Geography*, 86, 211-215.

32:RECENT TRENDS IN DEVELOPING GEOGRAPHY CURRICULA FOR SECONDARY SCHOOLS IN THE FEDERAL REPUBLIC OF GERMANY

Hartmut Volkmann

This paper highlights the most important characteristics of recently revised geography curricula in the Federal Republic of Germany. Since education in the Federal Republic is entirely the domain of the individual states (Lander), any changes, initiated by the respective governments, affect only those parts of the country under their jurisdiction. At present, the development of geography syllabuses tends to fragment the educational system of the Federal Republic rather than to promote its integration. The newly devised curricula demonstrate this clearly. They are from states in which the government is controlled by different parties: Baden-Wurttemberg and Schleswig-Holstein both with a Christian Democratic government and North Rhine-Westphalia with a Social Democratic government.

The paper will consider the events of the last four years. In 1983 new curricula were enacted in Baden-Wurttemberg and Schleswig-Holstein followed in 1986. In the same year the draft of a revised geography curriculum for grammar schools in North Rhine-Westphalia was published unauthorized. Though it may never be implemented, new textbooks were published based on its approach and so the unauthorized curriculum document has had some impact on the teaching of geography in this state.

To make alterations visible, the basic or core curriculum is quoted which, although designed and published in 1980, was meant to provide guidelines to bring together the divergent syllabuses of that time (the hope never came true) and which represent the character of the "new" curricula of the outgoing 1970s.

Features of revised geography curricula

Curricula are determined by pressures from outside the subject such as public opinion and the place in the school curriculum granted to the subject by educationists, and by developments within the subject itself which lead to a different selection and/or organization of content.

1. Teaching time

Most striking differences show the timetables for grammar schools while those for other school-types are somewhat alike (See Figure 32.1). In Schleswig-Holstein only, the subject is taught in all grades with a reduced time-frame in grades 12 and 13 (one half-year-course each). Baden-Wurttemberg has a similar regulation for the upper secondary level, but concentrates, however, geographical education in the lower secondary level deleting it almost completely on the middle secondary level. North Rhine-Westphalia reduces geographical education to four grades with one break (grade 6) in between. In grades 10 through 13 geography may be elected as optional subject. This possibility which gains greater weight in all states in grades 12 and 13 with up to 6 periods per week in advanced courses is not taken into consideration here.

The time allocated to geography has a strong effect on the choice of contents and on the depth in which a topic is studied. Furthermore, to exclude geography from higher school levels must inevitably lead to the exclusion of highly complex topics of geographical study. To restrict geographical education to the lower grades must necessarily reduce classroom work to talking about phenomena instead of seeking clear explanations for them. From this perspective the situation is most deplorable in North Rhine-Westphalia, while in Schleswig-Holstein the expectations of the core curriculum, as well as of the parents' advisory board, are met.

This difference originates in political dispositions. In North Rhine-Westphalia the field of political education, of which geography is a component, is to be taught alike in all types of schools while in the two other states the amount of time allocated to political education varies.

2. Aims and objectives for geographical education in grammar schools

Though aims are bound to remain general they provide a clue of basic intentions of the curriculum. The core curriculum of 1980 states that its aim is:

"to enable the student to understand and responsibly take part in decisions on land use and contribute to improving the quality of life." (Zentralverband, 1980:5)

Obviously, the authors wanted to prepare the student for his or her future role in public life for which qualifications instead of knowledge are needed, least of all a mindless role learning of capes and bays.

A different tone prevails in the Baden-Wurttemberg

Grade	Baden-Wurttemberg			Nordrhein-Westfalen			Schleswig-Holstein		
	Gy	RS	HS	Gy	RS	HS	Gy	RS	HS
5	3	2	3	2	2	1.5	2	2	2
6	2	2	2	—	2	2	2	1	1
7	2	2	1	2	2	1.5	2	2	2
8	2	—	1	2	1.5	1.5	2	2	1
9	—	2	1	2	1	2	2	—	1
10	—	1	—	(2)	1	—	2	2	—
11	2/1*			(3/6)			2		
12	1(5)			(3/6)			1(2)		
13	1(5)			(3/6)			1(2)		

Explanations: Gy = Gymnasium = grammar school
RS = Realschule = secondary modern school, higher level
HS = Hauptschule = secondary modern school, lower level

( ) optional course
* modern language branch

Figure 32.1 Teaching time for geography in secondary schools (hours/week)

syllabus, which states that its aim is:

"to give the student insight into landscapes and people, and guidance for responsibly taking part in shaping the environment." (Ministerium, 1983:7)

The first part clearly indicates that the student is initially to obtain a regional overview and understanding of people before acquiring the ability to contribute to developing the environment. Of course, much depends on how much weight is given to each part.

The North Rhine-Westphalian syllabus adopts a different tone again. It aims:

"to give the student an intimate knowledge of mankind's spatial environment and of the interdependence of mankind's activities and environment." (Kommission, 1986:13)

Compared to the aim of the Schleswig-Holstein syllabus, it is evident that omissions in such documents may indicate more than the explicit statement. The syllabus for Schleswig-Holstein states that the aim of geography is:

"to convey to the student a clear and vivid picture of the world and the interdependence between mankind and space." (Kultusminister, 1986:1)

As in the case of Baden-Wurttemberg, great significance is ascribed to establishing a picture of the world which is value laden, instead of a more scientific approach to problem-solving and decision-making. All syllabuses name numerous teaching objectives which cannot be detailed here. If, however, geographical education is to foster cooperative behaviour between employers and employees the adequacy of this objective has to be questioned.

3. Basic structuring principles and regional studies

In 1982 Haubrich characterized the West German geography curricula as rejecting "the regional sequence according to the concentric circles of distance from near to far." (1982:109)

Five years later the geography curricula of Baden-Wurttemberg and Schleswig-Holstein are once again following the old principle (See Figure 32.2).

The start was made by Baden-Wurttemberg whose Minister of Education demanded a return to the old structure of geographical education. He found himself in agreement with the parents' advisory boards who had never fully understood nor accepted the "new geography" of the 1970s. Many teachers took the same point of view. Only recently (March 1987) the federal parents' advisory board agreed on a resolution demanding that the home region (Heimat) be considered as essential content in geographical education through to grade 6, to be followed by an overview of the world (Bundeselternrat, 1987:43-44).

Basic Curriculum 1980	Baden-Wurttemberg 1983	Nordrhein-Westfalen (1984) 1986	Schleswig-Holstein 1986
from simple to complex facts	from nearby to far away regions from known to unknown facts from apparent to abstract matters from simple to complex matters	decreasing didactical reduction of geographical material growing degree of complexity and abstractions growing use of methodological knowledge and abilities growing command of geographical terms	from nearby to far away regions cultural continents

Figure 32.2 Basic structuring principles in selected FRG geography curricula

Figure 32.2 reveals that the curriculum for Baden-Wurttemberg attempts a synthesis of the expanding environment principle while more psychologically-founded principles are the sole base of the syllabus in North Rhine-Westphalia. The authors of the latest syllabus, that for Schleswig-Holstein, are content with the expanding environment principle. In fact, they do not intend even to regard growing complexity as a necessary requirement for structuring a geography curriculum (Newig et al., 1987:6). They argue that "cultural continents", their second structuring principle, all show the same complexity - a statement which is only too true. In a sort of short-circuited explanation they find that neither of these principles contradict each other - which is true, too. Amazingly enough, they do not see that the development of the students' knowledge and abilities over a period of five years has to be matched by a growing complexity of the contents taught.

The sequence of regions which is compulsory in all syllabuses shows some correspondence (See Figure 32.3). For example, most of the state syllabuses specify that students should study examples from Germany in grade 5, the non-European continents in grades 7/8 and finally compare the USA and USSR. The last example, however, indicates the existing differences in the co-ordination of contents and grades. The differences became more obvious when the topics are examined more closely. The Baden-Wurttemberg curriculum reserves a substantial part on the state itself while only 15 out of 90 periods deal with themes related to other parts of the Federal Republic. The German Democratic Republic (GDR) is not included at all which reveals a peculiar understanding of the term "Germany". Of Europe, only states with a Western-orientation appear to be deemed worthy of some attention. The exception to this rule is the GDR which is given about 6 out of a total of 60 periods. In this regard the other syllabuses are more generous: in North Rhine-Westphalia about 25 periods deal with themes on the GDR, while in Schleswig-Holstein there are 10 with another 16 periods allocated to studies of Eastern and Southeastern Europe.

A special feature of the North Rhine-Westphalian curriculum is that it suggests two alternatives which in grade 5 are arranged either along regional lines (the Rhein-Ruhr-agglomeration, the North Sea coast, the Alps, the Rhein-Main-agglomeration, GDR) or along thematic lines (how to find one's way; how mankind makes use of differently endowed agrarian regions; conditions in industrialized regions; the importance of different modes of transport; and recreation and modes of travelling in various regions). In later grades the regional variant appears less distinct and the thematic approach comes to dominate the second alternative, too. For example, the syllabus for grade 7 specified climatic and vegetation zones, agriculture in different regions, industry and agriculture in the USSR.

4. Implementation of concepts in course content

The Schleswig-Holstein syllabus applies "cultural continents" (defined by religion or ideology, by language, legal systems, race, economy and location) as a means of structuring the content. Although the importance of cultures in shaping the environment cannot be doubted, this structure does not lead to curriculum progress. Rather it serves as a device to conceal a return to the old regional geography (Landerkunde). A study of the specified content will confirm this allegation. For grade 7, the Baden-Wurttemberg syllabus lists "Selected natural and economic regions in the arid belt of Asia and Africa" include:

"The Sahara: an extremely arid region;
Oases
Nomads in former times and today
Oil extraction in the Gulf region
Irrigation system in Egypt
The Sahel: an ecologically endangered region
Location of deserts on the earth".
(Ministerium, 1983:25)

This is not regional geography in the strict sense but rather subsumes thematic issues under a regional heading. In short, it is an attempt to combine both regional and thematic approaches.

Grade	Basic Curriculum 1980	Baden-Wurttemberg 1983	Nordrhein-Westfalen (1984) 1986	Schleswig-Holstein 1986
5 6	examples from Germany and the whole world	(SW) Germany The Alps, Europe, GDR	Germany —	Germany Europe
7	Germany, Europe, Africa	Africa, Asia, South America, Polar Regions	Non-European Continents: Latin America, China, Africa USSR	Mediterranean countries Near East Africa, south of Sahara
8	Latin America, Asia	India, China, Japan, USA-USSR	USA, Japan, Australia, Kuwait, India	India, China, South East Asia, Latin America
9	Germany, Europe, USA-USSR, EEC-Comecon	—	Europe	Great Britain, USA-USSR, Japan, Australia
10	Home region	—	—	Germany as part of Europe

Figure 32.3 The sequence of regions to be taught in selected FRG curricula

The North Rhine-Westphalian curriculum does not make this effort even in its more regional version. Under the subheading "Landuse in the periodically or continuously arid tropics" we find the themes:

"The Sahel, an endangered region
Oases in the life-hostile desert
The river-oasis Nile".

The theme of "Oil exports as a base for economic development" is placed under the heading "Economic development based on the different availability of natural resources" which is suggested for grade 8. (Kommission 1986:26-27)

For the Schleswig-Holstein syllabus the Near East serves as show-piece to demonstrate the idea of a "culture continent". Under the heading "the oriental culture region" and the subheading "the importance of a religion" the following themes are listed:

"States and natural segmentation
Islam
The oriental city
In the Sahara desert
Changing oases
Irrigation systems
Landuse without irrigation
The Nile and the Aswan dam
Natural oil and gas in the Gulf
From a developing country to a wealthy state
(Kuwait)
Israel and the Near East".
(Kultusminister, 1986:11-12)

The intention to touch upon all facets of the region rather than to reveal patterns becomes evident. Unfortunately, the scheme divides Africa into Arab and Black parts, and treats Australia and Oceania as one unit while neglecting any similarity between Australia and Canada. The attempt to select a state "representative" of each region is doomed to failure.

In contrast to the two other curricula the North Rhine-Westphalian syllabus specifies the knowledge and abilities that students are expected to command at the end of the middle secondary level. Students are required to have the ability to determine the height of a mountain with the help of a map, and for the first time the syllabus includes statements about the minimum amount of factual information which should be memorized by the end of each grade. Even the syllabuses of the 1950s never went into this detail. Both the other curricula pay more attention to the learning of capes and bays although they refrain from fixing the precise items to be memorized.

5. Teaching strategies

In this respect the North Rhine-Westphalian curriculum goes far beyond the other two in that it deals at great length with matters such as organization of classroom work, possible student activities, home assignments, evaluation of specific media and test construction. No preference is given to any method. The choice is left entirely to the teacher. However, when thumbing through the syllabus he or she may be reminded of possibilities that had been neglected or even forgotten for some time.

The curriculum exerts some influence on teachers in the field of test construction. Several examples are given for each grade indicating the previous work in class, setting tasks with the required materials added and suggesting ways of grading the student's answers.

Conclusion

The main innovation of the 1970s, namely the substitution of regional geography by an exemplary thematic approach has been reversed in some states. The main reason for this was the failure of geographical educators to convey their ideas to geography teachers and, even more so, to parents. This lack of understanding gave rise to an opposition which made a major issue of the students' alleged lack of factual knowledge. This supposed deficiency was never proved, simply because no longitudinal studies were conducted. The only investigation into the matter revealed no significantly different levels of factual knowledge of students who had followed the various curricula. Despite this, the prejudice was sufficient to blackmail those designing the new curricula and positive changes such as increased student activity and a greater competence in arguing an issue were ignored.

The return to regional geography reduced the possibility of discussing environmental or planning issues that might lead to conflict in society. An approving rather than a critical attitude is what politicians want from their citizens. It is not accidental that the change was initiated in Baden-Wurttemberg where civic disobedience prevented the construction of a nuclear power station and a car testing track when the Green Party entered parliament for the first time.

REFERENCES

Bundeseltembeirat (1987) *Resolution, Geographie und Schule*, 48, 43-44.

Haubrich, H. (1982) The Reform of the Geography Curriculum in the Federal Republic of Germany, *International Focus on Geographical Education*, Braunschweig, 100-118.

Kommission (1986) *Richtlinien Erdkunde*. Gymnasium Sekundarstufe I - Nordrhein-Westfalen, Schulgeographie, 63, 11-40.

Der Kultusminister des Landes Schleswig-Holstein (1986) *Lehrplan Gymnasium*, Erdkunde Klassenstufen, 5-10, Kiel.

Ibid. *Lehrplan Gymnasium*, Erdkunde Oberstufe, Kiel.

Ibid. *Lehrplan Realschule*, Kiel.

Ibid. (1986) *Lehrplan Hauptschule*, Kiel.

Ministerium fur Kultus und Sport Baden-Wurttemberg (1983) *Lehrplan revision in Baden-Wurttemberg*, Gymnasium Erdkunde, Stuttgart.

Ibid. (1983) *Realschule Erdkunde*, Stuttgart.

Ibid. (1983) *Hauptschule Erdkunde*, Stuttgart.

Newig, J. et al. (1987) Pladoyer fur einen neuen Geographieunterricht (Pleading for a New Geographical Education) *Schulgeographie*, 64, 3-7.

Zentralverband Deutscher Geographen (1980) *Basislehrplan "Geographie", Empfehlungen fur die Sekundarstufe I.* (Basic Curriculum "Geography", Recommendations for Lower/Secondary Levels), Wurzburg.

33: OBJECTIVES FOR FIELD WORK AND LABORATORY STUDIES IN GEOGRAPHY AT PRIMARY AND SECONDARY SCHOOLS

Sonia Maria Carneiro

This paper is based on a study of the importance and viability of field work and laboratory studies in the teaching of Geography in upper primary and secondary schools within the Brazilian school system. The study started with a survey of the teaching of Geography at secondary level in selected schools in Curitiba, the state capital city, and in rural areas of the state of Parana in southern Brazil. This survey revealed three basic problems affecting the teaching of Geography:

1. A low degree of student participation in classroom activities;
2. Teaching practices lacking in specific means or resources to teach geography; and
3. An absence of practical activities, such as field work and laboratory studies.

These problems are all part of a vicious circle: deficiencies in the use of maps, globes, atlases and other resources in the teaching of geography and the absence of practical learning activities lead to low commitment by students. In turn, this behaviour on the part of the students encourages the teachers to use conventional, routine procedures, and do not encourage the teachers to improve their teaching. The study focussed on field work and laboratory studies as pedagogical alternatives to conventional teaching approaches. Field work and laboratory studies presuppose and demand both practicality and the use of specific resources, thus prompting the students' participation in an active approach to learning geography.

The study resulted in the validation of the twenty-eight objectives or intended learning outcomes which may be expected from field work and laboratory studies. These objectives were established by means of a scale-structured attitude questionnaire, which sampled 80 per cent of the in-service geography teachers in the upper primary and secondary schools of Curitiba, during the first semester of 1985.

The objectives were derived from the three areas in which the development of children and young people may be encouraged through geographical education:

1. thinking skills, i.e. mental operations that the student should develop regarding basic geographical concepts and principles (location, relation, change, interaction etc.);
2. technical skills, i.e. practical and specific operations which may be used in the study of geography; and
3. attitudes, i.e. affective and value-oriented dispositions which the student may be encouraged to develop from previous experiences and within the school context.

The objectives sought to embody a contextual and dynamic concept of geography, that is, conveying spatial organization on the earth's surface as the main perspective on geographical studies at the indicated curricular levels.

Each objective is written as a general statement and is followed by explanatory suggestions on how it may be achieved.

1. Thinking skills related to field work and laboratory studies

i) Relating specific concepts to geographical phenomena: students explain and/or justify the propriety of concepts to identify geographical phenomena observed either in the field or through slides, filmstrips, models or photographs.

ii) Defining places or areas according to different criteria: students locate, explain, specify and classify places or areas in terms of access, transport means, characteristics or soil or production sources.

iii) Ascertaining the relationships of elements in different geographical spaces: students analyse and explain the interaction and interdependence of geographical phenomena - physical and human - in different contexts such as interrelating vegetation and climate, topography, farming and technology or industry and natural resources.

iv) Comparing two or more geographical areas: students identify and analyse both human and physical characteristics and features of each area, pointing out similarities and differences such as economic activities, natural conditions, transport or regional influence.

v) Explaining the similarities and differences between two or more areas: students search for, select and evaluate geographical reasons to explain similarities and differences between areas.

vi) Analysing transformations of different geographical spaces: students identify, explain and evaluate changing features and socio-economic or cultural functions of an area over time.

2 (a) Technical skills related to field work

i) Locating surveyed areas or places: students locate areas or places being observed, in relation to the cardinal and collateral points. They refer to the sun, to shadows and the compass as means of orientation in the field.

ii) Reading local and regional large-scale maps: students orient themselves by matching a map to the observed environment. They identify actual features, characteristics or marks represented conventionally and ascertain scale proportions regarding measures of distance within an area.

iii) Reading aerial photographs: students recognize the meaning of photographic features in comparison to perceived reality.

iv) Structuring schemes and questionnaires: students work out plans or schemes for field observation and interview-questionnaires in order to collect data according to previously set objectives.

v) Executing plans, schemes and interview-questionnaires: students follow established plans or schemes for field observation, as well as interview guides or questionnaires to gather data.

vi) Collecting field samples: students collect adequate field materials in accordance with the study objectives. They collect samples of natural and/or cultural aspects of the environment such as rock pieces, portions of soil, vegetation, fossils, pieces of industrial or handicraft products.

vii)Recording field observations: students use suitable techniques or procedures to record observations in the field by means of free writing, following guides or schemes, answering questionnaires and making diagrams, graphics, photographs or maps.

viii)Recognizing geographical features through different representation forms: students interpret geographical information conveyed in profiles, drawings and diagrams.

2 (b) Technical skills related to laboratory studies

i) Reading globes and maps in different projections and scales: students focus on places and geographical data of physical and human significance, considering both latitude and longitude and interpreting symbols and scales.

ii) Interpreting maps, globes and aerial photographs: students associated geographical data and phenomena represented or depicted, analyse the relationships and draw conclusions.

iii) Comparing aerial photographs and maps: students match data and phenomena presented in aerial photographs and maps.

iv) Analysing geographical data and phenomena presented in various modes of communication: students discriminate, describe and categorize data and information given in tables, graphs, pictures, slides, video tapes and filmstrips.

v) Analysing samples collected in field work or present in the laboratory: students discriminate, describe and categorize features and attributes of different kinds of samples.

vi) Organizing samples collected in field work or present in the laboratory: students classify samples according to predetermined criteria.

vii)Constructing layout or display forms of geographical data and materials that respresent geographical elements and features: students draw graphics, profiles, sketch-maps and build models.

viii)Developing diversified experiences in field of geography: students follow specific objectives of study to conduct diversified learning experiences, either through observation or simulation - with reference, for example, to the earth's movement and diastrophism or to climatic elements and weather conditions by means of laboratory resources or materials which they have made themselves.

3. Attitudes related to field work and laboratory studies

i) Participating effectively in the dynamics of educational interaction: students exchange ideas and experiences with the teacher, team-work companions and members of their class, seeking and/or giving assistance.

ii) Cooperating with peers and teacher in the development of learning activities: students initiate work plans or projects, contribute ideas and suggestions to a course of activities or to the solution of specific study problems; perform voluntary inquiry activities and accept responsibility for assignments or roles either individually or in groups.

iii) Appreciating geographical problems from an ecological perspective: students reveal awareness and the development of a sensitive perception of the interplay of organic and physical agents within and among ecosystems in a given environment.

iv) Valuing inquiry and study procedures according to scientific methodology: students show interest in observing, analysing and interpreting geographical data with objectivity and purpose.

v) Evaluating the role of human beings in transforming the physical environment: students develop an interest in and an alertness to the changes that human activity causes in various physical environments.

vi) Developing an aesthetic perception of the environment: students display a sensitive appreciation of both natural and human landscapes upon the earth's surface.

Conclusion

In its role of pedagogical reference, this set of objectives is intended to be used progressively throughout the geography curriculum in primary and secondary schools, whenever a program includes or could include field work and laboratory activities. In addition to its pedagogical application, the objectives may also be used as a basis for research on the applicability of field work and laboratory work in other school settings. It is the writer's hope that this initial work may contribute to the improvement of geographical education in any school where a teacher seeks to develop his or her teaching skills in order to encourage students to appreciate geography as an interesting, useful and up-to-date area of knowledge and activity in the school curriculum.

ACKNOWLEDGEMENT

The writer wishes to acknowledge the assistance of Antonio Lineu Carneiro in translating this paper from Portuguese into English.

REFERENCES

Bailey, P., *Teaching Geography*, Canada, David & Charles Newton Abbot.

Biddle, D.S. (ed.) (1968) *Readings in Geographical Education*, The Australian Geography Teachers Association, 1.

Biddle, D.S. (ed.) (1973) *Readings in Geographical Education*, The Australian Geography Teachers Association, 2.

Bloom, B. et al. (1956) *Taxonomy of Educational Objectives*, Handbook I: Cognitive Domain, David McKay Company, Inc.

Bloom, B. et al. (1964) *Taxonomy of Educational Objectives*, Handbook II: Affective Domain, David McKay Company, Inc.

Carneiro, S.M. (1983) *A Geografia na escola de 2nd grau: um estudo diagnostico de variaveis de ensino sob o ponto de vista de professores e alunos*, Curitiba, Curso de Mestrado em Educacao.

Carneiro, S.M.M. (1985) "Conceituacao e importancia da Geografia segundo posicionamento de alunos do 2nd grau", *Boletim do Geografia*, Universidade Estadual de Maringa, 3 (3): 12-16.

Commission on College Geography (undated) *Field Training in Geography*, Washington, Association of American Geographers.

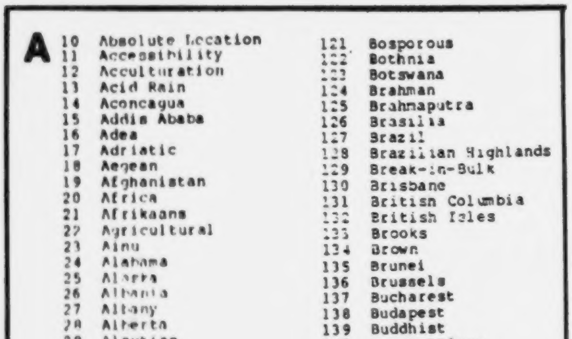
Graves, N. J. (ed.) (1982) *New UNESCO source book for Geography Teaching*, Longman/The UNESCO Press.

34: USES OF MDT MULTI-DIGIT TESTING IN GEOGRAPHICAL EDUCATION

Paul S. Anderson

The MDT multi-digit technique is a recently developed method to improve upon and facilitate the measurement of student learning, and to thereby stimulate student learning. Amongst its advantages are increased academic rigor, lower costs, savings of instructors' time, and improved feedback of information so that student learning can be further enhanced through the educational measurement process. A 200-page book, The MDT Innovation: Machine-Scoring of Fill-in-the-Blank Tests (Anderson, 1987), describes the many facets of the MDT technique. This study touches upon some major issues of the approach while focussing on the geographic applications of the method.

The central building blocks of the MDT multi-digit technique are one or more lists of discrete-answer responses in alphabetical order, each of which is numbered. Figure 34.1 is an extract from an MDT list for World Regional Geography. Each list is like a lexicon with up to one thousand terms, concepts and names.



A	10	Absolute Location
	11	Accessibility
	12	Acculturation
	13	Acid Rain
	14	Aconcagua
	15	Addis Ababa
	16	Adea
	17	Adriatic
	18	Aegean
	19	Afghanistan
	20	Africa
	21	Afrikaans
	22	Agricultural
	23	Ainu
	24	Alabama
	25	Alaska
	26	Albania
	27	Albany
	28	Alberta
	29	Aleutian
	30	Aleutians
	31	Alexandria
	32	Algeria
	33	Algiers
	34	Alienation
	35	Allah
	36	Alluvium
	37	Alps
	38	Altitudinal (vertical)
	39	Amazon
	40	Amsterdam
	41	Amu Darya
	42	Amur
	43	Anchorage
	44	Andes
	45	Angola
	46	Annapolis
	47	Antarctic(a)
	48	Antilles
	49	Antiplano
	50	Apartheid
	51	Appalachian
	121	Bosporous
	122	Bothnia
	123	Botswana
	124	Brahman
	125	Brahmaputra
	126	Brasilia
	127	Brazil
	128	Brazilian Highlands
	129	Break-in-Bulk
	130	Brisbane
	131	British Columbia
	132	British Isles
	133	Brooks
	134	Brown
	135	Brunei
	136	Brussels
	137	Bucharest
	138	Budapest
	139	Buddhist
	140	Buenos Aires
	141	Buffer Zone
	142	Bulgaria
	143	Burma
	144	Burundi
	145	Bustees
C	146	Cairo
	147	Calcutta
	148	California
	149	Cambodia
	150	Cameroon
	151	Campesinos
	152	Canada
	153	Canadian Shield
	154	Canberra
	155	Cancer, Tropic of
	156	Canton
	157	Cape Town
	158	Cape Verde
	159	Capital-Surplus/ Oil-Exporting
	160	Capitalism
	161	Capricorn, Tropic of

Figure 34.1 Part of an MDT list for World Regional Geography. The full list includes approximately 1000 terms.

When a student is asked a "fill-in-the-blank" style question for which a discrete answer is appropriate, the student first thinks of the answer, then refers to the alphabetized list to find that response and its code number, and subsequently marks the code number onto a specially designed answer grid. The answer grids, such as those shown in Figures 34.2 and 34.3, can be scored either manually or by an optical mark reader, commonly called a scanner. The power of the multi-digit method only becomes fully apparent when coupled with the power of computer analysis and feedback, as discussed later in this study.

Geographers without access to computerized scoring software and hardware can also utilize the MDT technique. They can take advantage of all of the positive features relating to student learning up to the point of the computer-generated feedback. The basics of the MDT technique are not specific to the English language nor to the United States educational setting. Since the ultimate goal of geographical (and all) education is the learning by the students, the following section discusses how the MDT method assists the learning process.

The measurement of student learning

The nature of learning is a vast topic discussed at length by educators worldwide. Two central issues involve discussion of what is to be learned and the measurement of what has been learned.

1. The content of geography.

Discussion of what is to be learned frequently focusses on Bloom's (1956) taxonomy of educational objectives. At the lowest level are the factual elements. A middle level deals with the application of such knowledge. The upper levels focus on evaluation and synthesis, the higher order thought processes.

The MDT technique has applications and benefits at all of those three major levels. The most obvious usage is in the lower or cognitive level. The MDT method requires that students "know" or are able to formulate the responses to specific questions. A geography student who cannot answer the question, "What is the capital of France?" is indeed deficient in factual knowledge. Furthermore, there are dozens of more difficult questions for which the answers would also be "Paris". At the

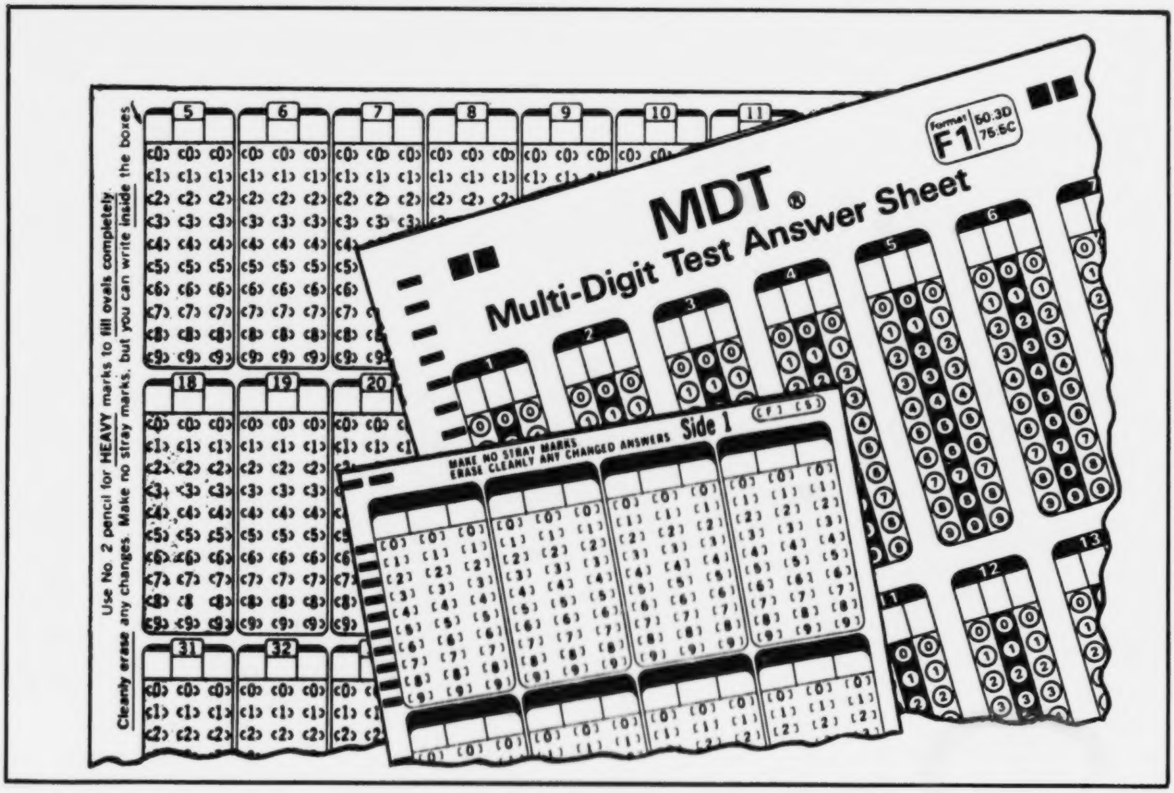

MDT ®
Multi-Digit Test Answer Sheet
Format F1 50.3D 76:6C
Side 1
MAKE NO STRAY MARKS
ERASE CLEANLY ANY CHANGED ANSWERS
Use No 2 pencil for HEAVY marks to fill ovals completely.
Cleanly erase any changes. Make no stray marks, but you can write inside the boxes.

Figure 34.2 Some examples of MDT answer sheets for computerized scoring.

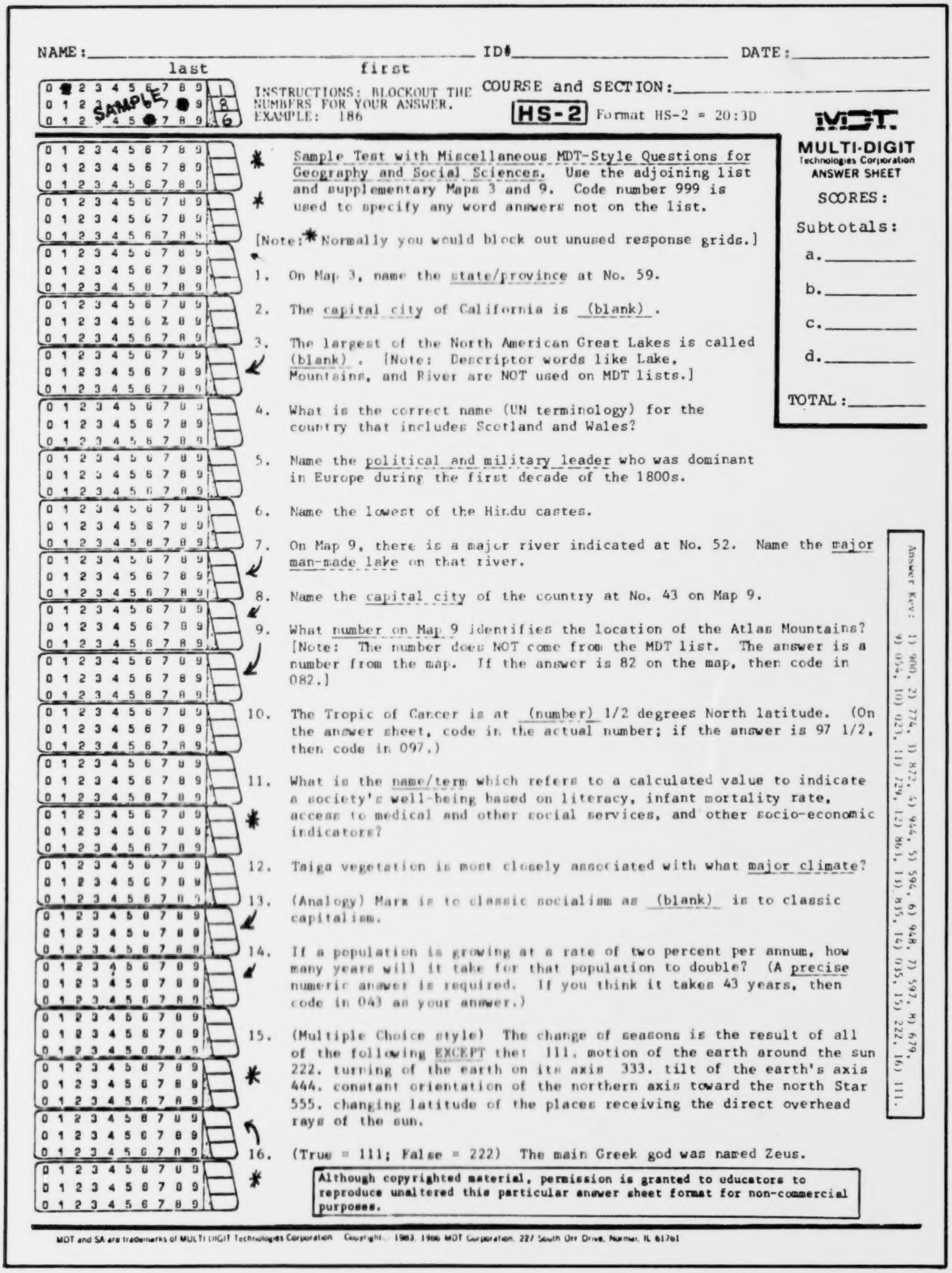
application level, the student might be presented with a series of diagrams representing a geomorphological process for which a concept could be identified and subsequently named using the long list of responses. Numeric responses can show the results of applied calculations. The higher order applications are discussed in a later section.

It is unfortunate that factual information is perceived as being something "lowly" and less worthy of learning. This has led many geographers to ignore or de-emphasize the importance of factual subject matter. This has been very much the case of geography in the United States since the 1950s. The term "capes and bays geography" was at best a derogatory term to steer geographers away from teaching basic geographical factual knowledge. In the opinion of the writer, the movement to de-emphasize basic knowledge has been highly detrimental to geographical education in North America. It has essentially removed from the curriculum of pre-university level education any attempt to ensure that American students know the location of places of the world. This is akin to mathematicians abandoning the teaching of multiplication tables to students in the lower grades. Every discipline has its basic building blocks of factual or cognitive knowledge. A major report from the (USA) National Endowment for the Humanities (Cheney, 1987) strongly criticized "the belief that we can teach our children how to think without troubling them to learn anything worth thinking about, the belief that we can teach them how to understand the world in which they live without conveying to them the events and ideas that have brought it into existence".

At some stage in the educational process "the facts" of geography must be taught to students. If they are not, the discipline will at best limp along with an ignorant general public and an inadequate foundation for higher order thinking by its professionals. These same comments apply not only to "place names" but also to knowledge of the basic processes of physical and human geography. Once taught, students should be held accountable for their learning. It is at the point of accountability that the value of the MDT technique becomes more evident.

2. The measurement of what has been learned.

Students can learn from a wide variety of teaching methods, including lectures, readings, experiments and field trips. However, in the final analysis, the teacher can only determine if the student has learned anything by asking the student to provide some form of feedback of information. The terms "feedback" and "educational measurement" are far more appropriate than the words "test, exercise, assignment" or even "evaluation", all of which carry the connotation of grading. All these forms of feedback are quite appropriate and can be used in a variety of combinations with the MDT technique in order to enhance the educational process.



NAME: ______________________ ID# ______________ DATE: ____________
last first

INSTRUCTIONS: BLOCKOUT THE NUMBERS FOR YOUR ANSWER.
EXAMPLE: 186

SAMPLE

COURSE and SECTION: ____________

HS-2 Format HS-2 = 20:3D

MDT
MULTI-DIGIT
Technologies Corporation
ANSWER SHEET

SCORES:

Subtotals:

a. ________

b. ________

c. ________

d. ________

TOTAL: ________

* Sample Test with Miscellaneous MDT-Style Questions for Geography and Social Sciences. Use the adjoining list and supplementary Maps 3 and 9. Code number 999 is used to specify any word answers not on the list.

[Note:* Normally you would block out unused response grids.]

1. On Map 3, name the state/province at No. 59.
2. The capital city of California is (blank) .
3. The largest of the North American Great Lakes is called (blank) . [Note: Descriptor words like Lake, Mountains, and River are NOT used on MDT lists.]
4. What is the correct name (UN terminology) for the country that includes Scotland and Wales?
5. Name the political and military leader who was dominant in Europe during the first decade of the 1800s.
6. Name the lowest of the Hindu castes.
7. On Map 9, there is a major river indicated at No. 52. Name the major man-made lake on that river.
8. Name the capital city of the country at No. 43 on Map 9.
9. What number on Map 9 identifies the location of the Atlas Mountains? [Note: The number does NOT come from the MDT list. The answer is a number from the map. If the answer is 82 on the map, then code in 082.]
10. The Tropic of Cancer is at (number) 1/2 degrees North latitude. (On the answer sheet, code in the actual number; if the answer is 97 1/2, then code in 097.)
11. What is the name/term which refers to a calculated value to indicate a society's well-being based on literacy, infant mortality rate, access to medical and other social services, and other socio-economic indicators?
12. Taiga vegetation is most closely associated with what major climate?
13. (Analogy) Marx is to classic socialism as (blank) is to classic capitalism.
14. If a population is growing at a rate of two percent per annum, how many years will it take for that population to double? (A precise numeric answer is required. If you think it takes 43 years, then code in 043 as your answer.)
15. (Multiple Choice style) The change of seasons is the result of all of the following EXCEPT the: 111. motion of the earth around the sun 222. turning of the earth on its axis 333. tilt of the earth's axis 444. constant orientation of the northern axis toward the north Star 555. changing latitude of the places receiving the direct overhead rays of the sun.
16. (True = 111; False = 222) The main Greek god was named Zeus.

*

Although copyrighted material, permission is granted to educators to reproduce unaltered this particular answer sheet format for non-commercial purposes.

Answer Key: 1) 900, 2) 774, 3) 872, 4) 944, 5) 594, 6) 948, 7) 597, 8) 679, 9) 054, 10) 023, 11) 729, 12) 861, 13) 835, 14) 035, 15) 222, 16) 111.

MDT and SA are trademarks of MULTI-DIGIT Technologies Corporation Copyright © 1983, 1986 MDT Corporation, 227 South Orr Drive, Normal, IL 61761

Figure 34.3 A Sample Test of MDT - style questions for geography and social sciences.

Without educational measurement, any instructor's estimate of the learning by students is merely a guess. However, the collection and evaluation of that feedback from the student is a time-consuming task that can be very costly and also ineffective. Review of student feedback takes time from teaching activities. A major benefit of educational measurement comes when the instructor's comments are returned to each student. However, the comments must be returned promptly and in appropriate detail. As class sizes grow and/or teacher contact hours are increased, the task of evaluating student performance becomes more onerous.

Each method of measurement and feedback has its advantages and disadvantages. Essay questions can provide very effective measurement, but they are highly costly in terms of instructor's time. The net result is a general infrequency of testing with essays, coupled with relatively few questions being asked. Instructors never know if the students could have answered the many questions that were not asked. Sometimes students' writing skills can cover their lack of core knowledge.

At the other extreme there is the existence of machine scoring of multiple choice questions. Hundreds of questions can be asked and graded in a short period of time, but the level of learning expected from the student is marred by student guesswork, recognition of correct answers from among the five choices, and the difficulty for teachers to select the five alternative responses. Somewhere between the two extremes of essays and multiple choice are the short answer (a sentence or two) and the fill-in-the-blank methods of written responses. The MDT multi-digit technique was originated as a near equivalent to the fill-in-the-blank style of questioning. The principal advantage of the MDT method is that while students are still expected "to know the answers" to the questions, the instructor is able to formulate each question and score the responses with considerable ease, speed and enhanced levels of feedback.

To illustrate the versatility of the method, a sample test is provided as Figure 34.3. The sample test uses the MDT list illustrated in Figure 34.1 and the supplementary materials in Figure 34.4. The response grids can be used for making other tests. A single-hole paper punch is used to make the answer key for rapid scoring.

One of the findings by the Canadian researcher, Philippe Duchastel (1983), is that frequent testing leads to improved student learning and retention of that learning. This research can relate both to standard testing procedures and also to the use of exercises and laboratory work which may or may not be submitted for a final course grade.

Geography and the origin of multi-digit testing

MDT multi-digit testing was originated by the author to assess a class of nearly ninety university students in a first year World Regional Geography course on their knowledge of basic place name locations from around the world. Without this knowledge, discussions of the situation in the Persian Gulf would have been conducted without students knowing where it is located. Machine scoring was highly desirable to save time and provide prompt feedback, but the standard multiple choice method with only five alternative responses meant thinking up four plausible wrong answers to offer as alternatives. With only five options, how could anyone possibly select Madrid or London or even Marseilles as the capital of France when Paris is also among the choices? The obvious solution was to offer the students a much longer list of alternative answers.

For geography, a long list of place names in alphabetical order is readily available in the gazetteer from an atlas. Three-digit code numbers were handwritten in front of nearly one thousand responses which would become eligible answers. A set of maps with numbered locations (examples in Figure 34.4) and a machine-readable answer sheet were also developed.

The pioneer experiences with the multi-digit technique are described in chapters two and three of The MDT Innovation (1987). The MDT technique which resulted far exceeded the initial expectations. The method has general applicability to all disciplines, and has been used by nearly two dozen professors in subjects ranging from art appreciation to veterinary pathobiology. Within geography, specific MDT lists have been prepared for introductory Earth Science, World Geography, Latin America, Africa and Map Reading. More are being developed. These materials plus the software for mainframe and microcomputers are available from the writer.

Enhancements to the multi-digit technique

During five years of research and development for the MDT method, the commercial MDT Educational System software has grown to include most of the traditional features associated with machine-scored educational measurement. Speed of scoring, standard statistical analyses, printed grade reports and a computerized grade book are all common features. However, far more significant are the unique characteristics of the MDT software.

1. Word responses in feedback to students and teachers

The power of computers and microcomputers permits the software to retain in memory the actual word responses that match each MDT label/code number. This information is especially useful in item analysis which indicates in a tabulated form those responses which were offered by the students, and in a printed report for each student showing the actual responses he/she gave. Examples are shown in Figure 34.5. The usefulness of these word responses should not be underestimated. Seeing the words can assist student learning and aid instructors to know how students have answered their questions.

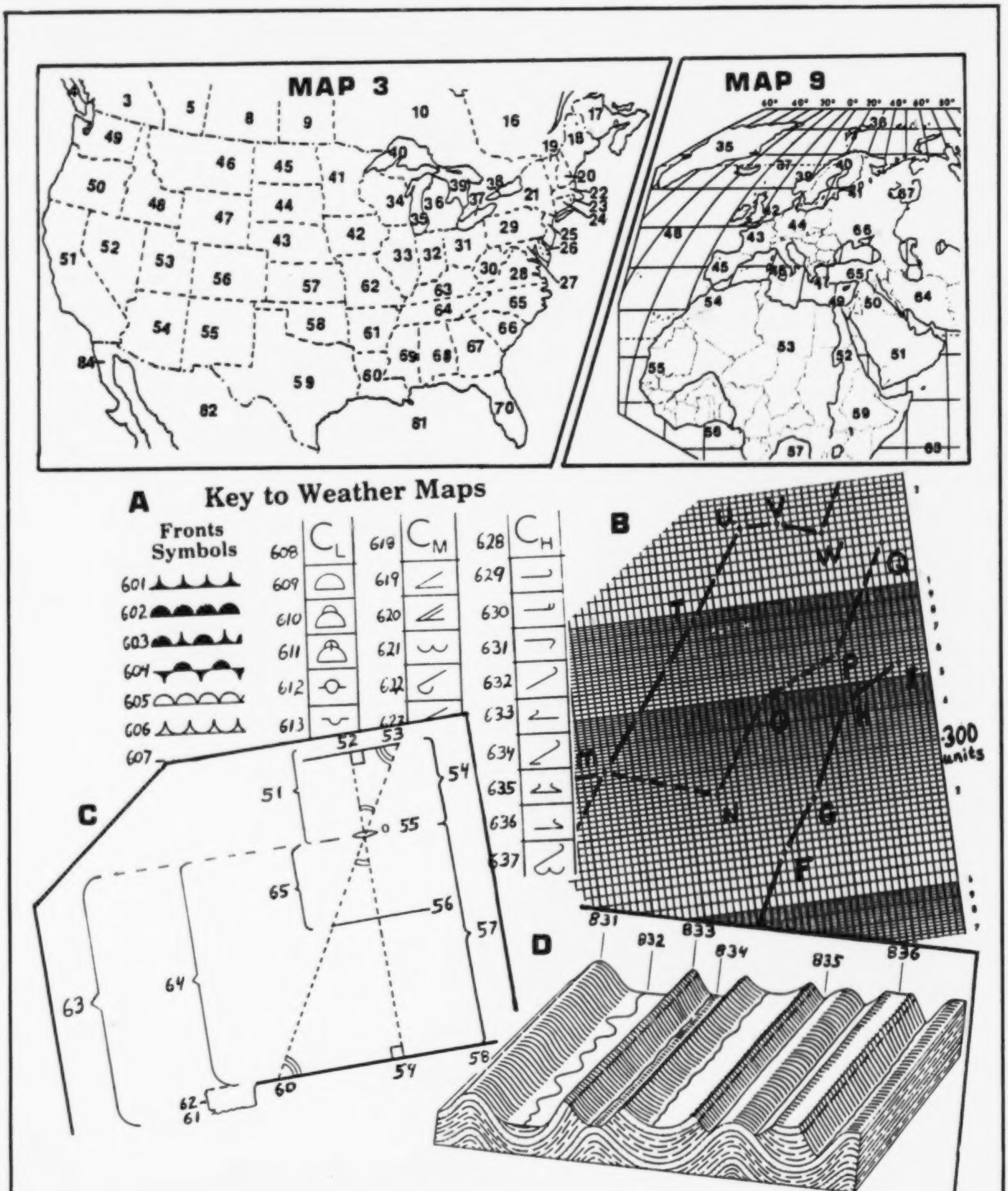


Figure 34.4 Examples of maps and other supplementary materials for MDT exercises in geography.

2. Actual numeric responses

When the response to a question is a number, that number becomes its own code. For example, for the question "How many states are there in the United States of America?" the correct answer would be encoded as "050". Other sample questions are included in Figure 34.3. The MDT method is also being developed to include the capacity to take non-integers as answers. In other words, for the question: "What is the dry adiabatic lapse rate of temperature change in units of Fahrenheit degrees per 1000 feet?", the correct answer of "5.5" would be encoded

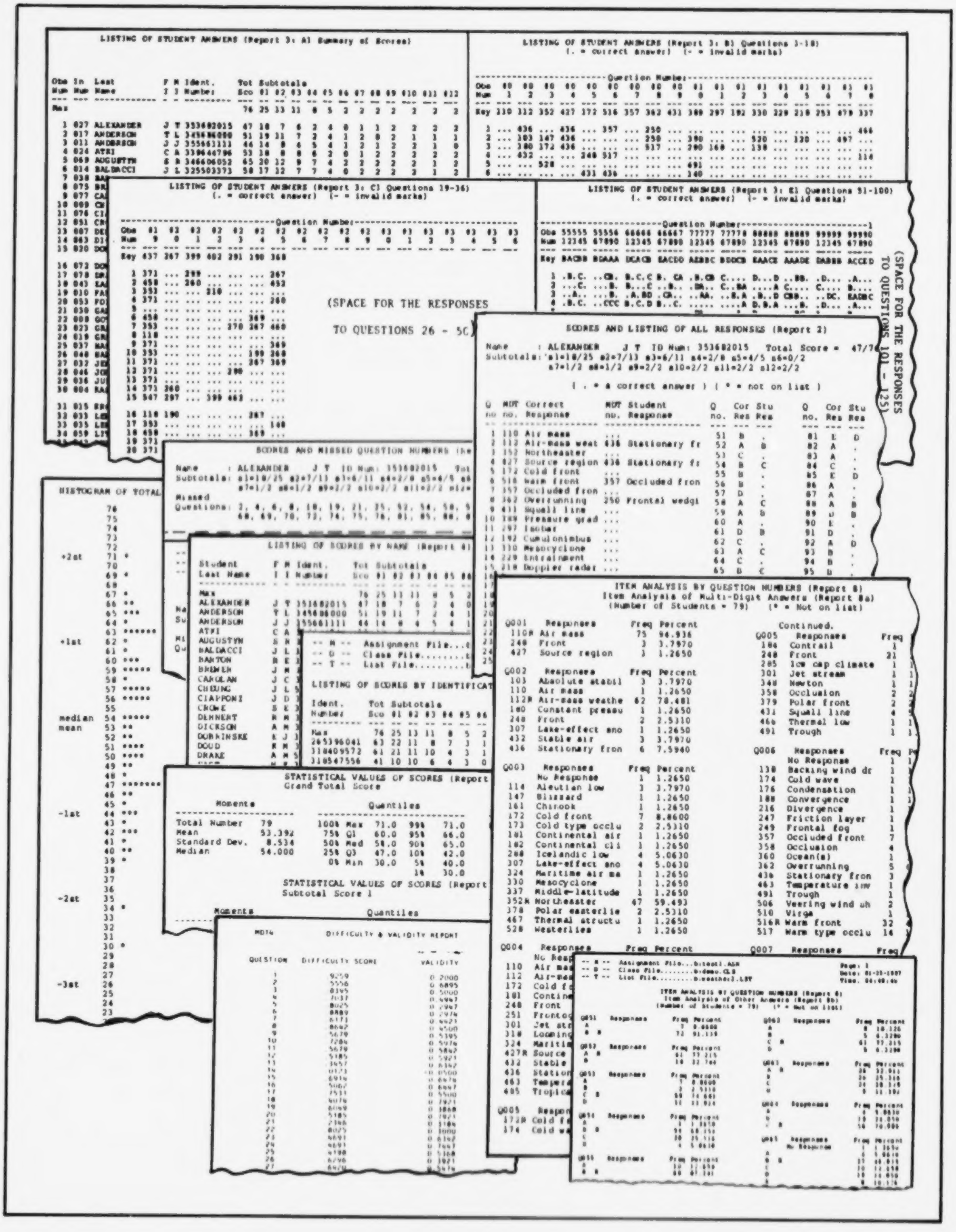

LISTING OF STUDENT ANSWERS (Report 3: A1 Summary of Scores)
LISTING OF STUDENT ANSWERS (Report 3: B1 Questions 1-18)
LISTING OF STUDENT ANSWERS (Report 3: C1 Questions 19-36)
LISTING OF STUDENT ANSWERS (Report 3: E1 Questions 51-100)
(SPACE FOR THE RESPONSES TO QUESTIONS 26 - 50)
(SPACE FOR THE RESPONSES TO QUESTIONS 101 - 125)
SCORES AND LISTING OF ALL RESPONSES (Report 2)
SCORES AND MISSED QUESTION NUMBERS
HISTOGRAM OF TOTAL
LISTING OF SCORES BY NAME (Report 4)
LISTING OF SCORES BY IDENTIFICATION
ITEM ANALYSIS BY QUESTION NUMBERS (Report 8)
Item Analysis of Multi-Digit Answers (Report 8a)
STATISTICAL VALUES OF SCORES (Report
Grand Total Score
DIFFICULTY & VALIDITY REPORT
ITEM ANALYSIS BY QUESTION NUMBERS (Report 8)
Item Analysis of Other Answers (Report 8b)

Figure 34.5 Examples of MDT computer-generated feedback reports to students and instructors.

onto the answer sheet and subsequently scored by the computer. This numeric response capability is especially useful in recording student answers to laboratory exercises and other computational work.

3. Multiple correct answers, partial credit and "reconsiderative" scoring

Many of the better test questions, especially those that relate to the higher orders of learning, can be answered by more than one valid response. For example, "name a prominent leader of geography in the early 19th century". Clearly, some responses are better and deserve full credit while others receive only partial credit or no points.

The traditional way of evaluating responses to machine scored questions requires that the answer key be provided by the instructor prior to the scanning of the answer sheets. In contrast, true fill-in-the-blank questions permit the instructor to see each student's response to each question and to then decide if the response is indeed valid or only partially valid. This constitutes "reconsiderative key generation", which means the decision about which answers are to be accepted is made after the responses are seen. In the MDT system, reconsiderative key generation is accomplished when the computer presents a tabulated item analysis of all of the student responses including the actual words offered. The instructor can then designate the point allocation for each response. In the case of numeric responses, the correct answer could actually fall within a range of acceptable responses depending upon degrees of accuracy of measurement in laboratory exercises.

By coupling reconsiderative partial credit of multiple responses with the previously mentioned MDT capabilities to provide word response feedback to students, the MDT Educational System produces powerful tool for computer assisted educational measurement.

Applications of the MDT technique beyond educational testing

The MDT multi-digit technique as described above should be viewed as something far more than a test scoring package. It is essentially a means of tabulated machine-assisted interaction between student respondents and the instructor who is expected to review those student responses and to make appropriate comments. Student responses to laboratory exercises or field work observations could even be processed individually for immediate feedback with later composite feedback for the instructor. There is no requirement to grade such responses in any competitive manner. The entire student exercise can be done for purposes of student learning without any element of evaluation.

On the other hand, students will place special emphasis on learning the knowledge and skills that they know can be expected of them in a course of study. If student learning can be effectively evaluated either in comparison with others or in comparison with previous efforts, students will become more aware of the instructor's desire to know the current level and the amount of improvement in their knowledge. Most teachers are well aware that if an assignment is collected but not returned promptly with feedback to the students, student motivation to complete such exercises in the future is greatly diminished.

Conclusion

There are many factors which contribute toward the timeliness and acceptance of the MDT multi-digit technique worldwide (Anderson and Saliba, 1987). In North America, the issue of academic rigor is of paramount importance. In Europe and Australia, machine scoring can now be used without multiple choice questions. In Third World countries, the dramatic increase in the number of students who need quality education requires that modern, 20th century solutions be utilized. The power of micro-computers now permits the capabilities of the MDT technique to be available to vast numbers of educators who were previously tied to multiple choice questions or to no computer scoring at all. The field of geography is extremely well placed to take the lead in introducing the MDT enhancement to educational practices at the full range of school levels in nearly every country.

The ultimate goal of all education is the enhancement of student learning. The MDT technique has many features which should be beneficial in that regard, while simultaneously offering benefits to educators and their schools.

REFERENCES

Anderson, Paul S. (1987a) *The MDT Innovation: Machine Scoring of Fill-in-the-Blank Tests*, Multi-Digit Technologies Corporation, Normal, Illinois, USA.

Anderson, Paul S. (1987b) *Answer Banks and Question Banks for Immediate Classroom Use: MDT Materials for Geography and Social Studies*, Paper presented to the annual meeting of the Illinois Geographical Society, Elgin, Illinois, USA.

Anderson, Paul S. and Alcyone Saliba (1987) *Changing World Patterns of Machine-Scored Objective Testing: The Expected Impact of the Multi-Digit Method*, Paper presented to the Sixth World Conference of Comparative Education, Rio de Janeiro, Brazil.

Bloom, Benjamin (ed.) (1956), *Taxonomy of Educational Objectives: Cognitive Domain*, New York, David McKay Company.

Cheney, Lynne V. (1987) *American Memory: A Report on the Humanities in the Nation's Public Schools*, National Endowment for the Humanities, Washington, D.C., USA.

Duchastel, P.C. (1983), "Testing to Aid Text Processing" *Human Learning*, 2, 209-214.

35: STIMULATING ENDOGENOUS TEXTBOOK DEVELOPMENT IN THE CARIBBEAN MICRO-STATES

Mike Morrissey

Throughout the Commonwealth Caribbean, *social studies* has been adopted as an essential ingredient of the curriculum diet of primary schooling. This subject, almost unheard of before the 1960s, is now established in nearly every primary school system of the seventeen political units which once comprised the British Empire in the Caribbean.

The pioneering work in social studies was done in Trinidad and Tobago (Beddoe and Seepersad, 1985) and in Jamaica (Morris, 1976) in the late 1950s and early 1960s. By the 1970s, the subject was being adopted in Guyana, St. Lucia, St. Kitts-Nevis, Dominica and one or two other territories. By the mid-1980s, even the smallest of the remaining colonies, now referred to as "British Dependent Territories", had adopted the subject at the primary level. Morrissey (1987a, 1987b) has discussed the development and diffusion of social studies at the regional level at both primary and secondary levels.

In integrating Geography, History and elements of other social science disciplines into the single broad-based subject called *social studies*, a thorough reformation of the content and methodology in this area of the curriculum became feasible. Equally important, the new subject became an instrument of nation building as the dedicated group of pioneer social studies educators, who worked strenuously to gain acceptance for the subject in the region, viewed it as an instrument of decolonization. It was believed that the subject could help in the process of:

1. replacing colonial viewpoints prevalent in the curriculum with regionalist and nationalist ones;
2. improving self-esteem and self-concept in new generations of citizens passing through primary schools;
3. developing support for, and an understanding of, new national and regional institutions that were coming into being; and
4. breaking down racial and social barriers within Caribbean communities.

There is a common Brunerian spiral pattern in the curriculum structures which evolved in social studies throughout the Commonwealth Caribbean: self, home, school and community are emphasized in the lower grades; knowledge of nation is developed in the middle grades; and the Caribbean region and the wider world are introduced in the upper primary grades. This format is exemplified by the structure recommended in the regional *Primary Education Project curriculum guide for Social Studies* (UWI/USAID 1984) and the structure was applauded by the project evaluators (Massanari and Miller, 1985).

Most Caribbean territories now have a national curriculum for primary social studies. This may consist either of a simple syllabus, or a teachers' guide. However, support materials, particularly reading material for pupil's use, are seriously lacking in many territories although Jamaica, Trinidad and Tobago are partial exceptions. The lack of support materials is particularly evident in the smaller indepenpent countries and the British Dependent Territories.

Several problems are common to the micro-states in relation to the teaching of children about their own countries:

1. There is a dearth of print material on the history, geography, economy, political structures and social aspects of the countries, even for the teacher to use as source material.
2. Teachers have either been trained in the larger islands of the region, or are untrained. Few have made a serious study of their own country.
3. In the entire history of primary education in the smaller countries, there have never been textbooks about these countries themselves.
4. No one in such countries has experience of school textbook authorship or book production.

These were certainly the conditions in each of the three micro-states in which the writer established textbook development projects.

How do school textbooks come into being? Some are written by a single author, working independently. Others are written by a small group of collaborators who either share tasks or work together as a team. A third approach is to put together a group of potential authors in a workshop situation, give them on-the-job training and set regular production targets. It was this latter approach which was adopted to fill the demand for social studies materials in the three countries.

The writer was invited by UNESCO in 1985 to assist with the development of primary level social studies in Anguilla and in the Turks and Caicos Islands in projects funded by UNDP to "strengthen the education systems of those territories". After exploratory workshops in both places, he proposed that, to maximise long-term benefits of the very limited amount of workshop time available, attempts should be made to use groups of teachers to develop textbooks about their own countries in support of the primary social studies syllabus. It was argued that:

1. in this way a tangible product would result from the investment of the limited time and money;
2. the anticipated product would be particularly beneficial to the school population who would then, for the first time be able to read about places familiar to them;
3. the teachers as writers working in a cooperative framework would benefit in terms of knowledge of their own country and in the acquisition of enquiry skills in teaching and learning (see King et al., (1983) for the writer's position on social studies methodology for Caribbean schools);
4. the resulting textbook would have local authorship and would act as a symbol of the growing independence of these incipient nations.

The government of the Cayman Islands became aware of these projects, and asked for assistance with a similar project early in 1987. This paper, therefore, presents a preliminary description and evaluation of three textbook development projects written at a time when all are on-going. The author has been asked to undertake similar exercises in Saint Maarten and St. Kitts-Nevis later this year.

The title of this paper includes the term "endogenous". The strategy adopted envisaged new resource materials originating from within these micro-states with the writer acting as the catalyst or change-agent. What was adopted in terms of curriculum theory, was a "Social-Interaction Model" (Havelock, 1969). The purpose of adopting this model is, among other things, to assure the widespread adoption and dissemination of the innovatory materials by involving the client population directly in the innovatory process. The writer, as change-agent in such a process, functions in a combination of roles - catalyst, resource person and counsellor (Hoyle, 1971). The teachers, in each of the countries, were central to the strategies used.

Planning the projects

In each of the three projects, ten to twelve primary school teachers were selected by their Education Departments to participate in five-day writing workshops to generate the complete first-draft manuscripts of textbooks for Grade 4 pupils. Although some effort was made to select persons of potential ability as writers who were knowledgeable about their own country, many were severely limited in experience, creativity and even basic knowledge. Efforts were also made in selecting the team to ensure a balance from the various parts of each country since even in the smallest territory, inter-island and intercommunity jealousies are rife. Balancing the authorship in terms of geographical and political allegiance would, it was hoped, ensure widespread acceptance of the final product.

Prior to each workshop, a list of chapters for the text book was drafted in consultation with Education Officers and teachers, and those invited to participate in the writing exercise were given the task of collecting source material on a particular theme. Figure 35.1 shows the writing team and the contents chosen for the book on Anguilla. The outline of the Anguilla text was shaped largely by the new social studies syllabus (Morrissey, 1986) which was based on the Primary Education Project guides referred to earlier. The Turks and Caicos Islands and the Cayman Islands already had syllabuses in place (Turks and Caicos Islands Ministry of Education, 1984; Cayman Islands Education Department, 1984) and the content of these syllabuses influenced the content of their textbooks. Each one of the three manuscripts is therefore unique, reflecting the interests and needs of the particular micro-state, despite the similarities in strategies followed to stimulate their creation.

The writing process

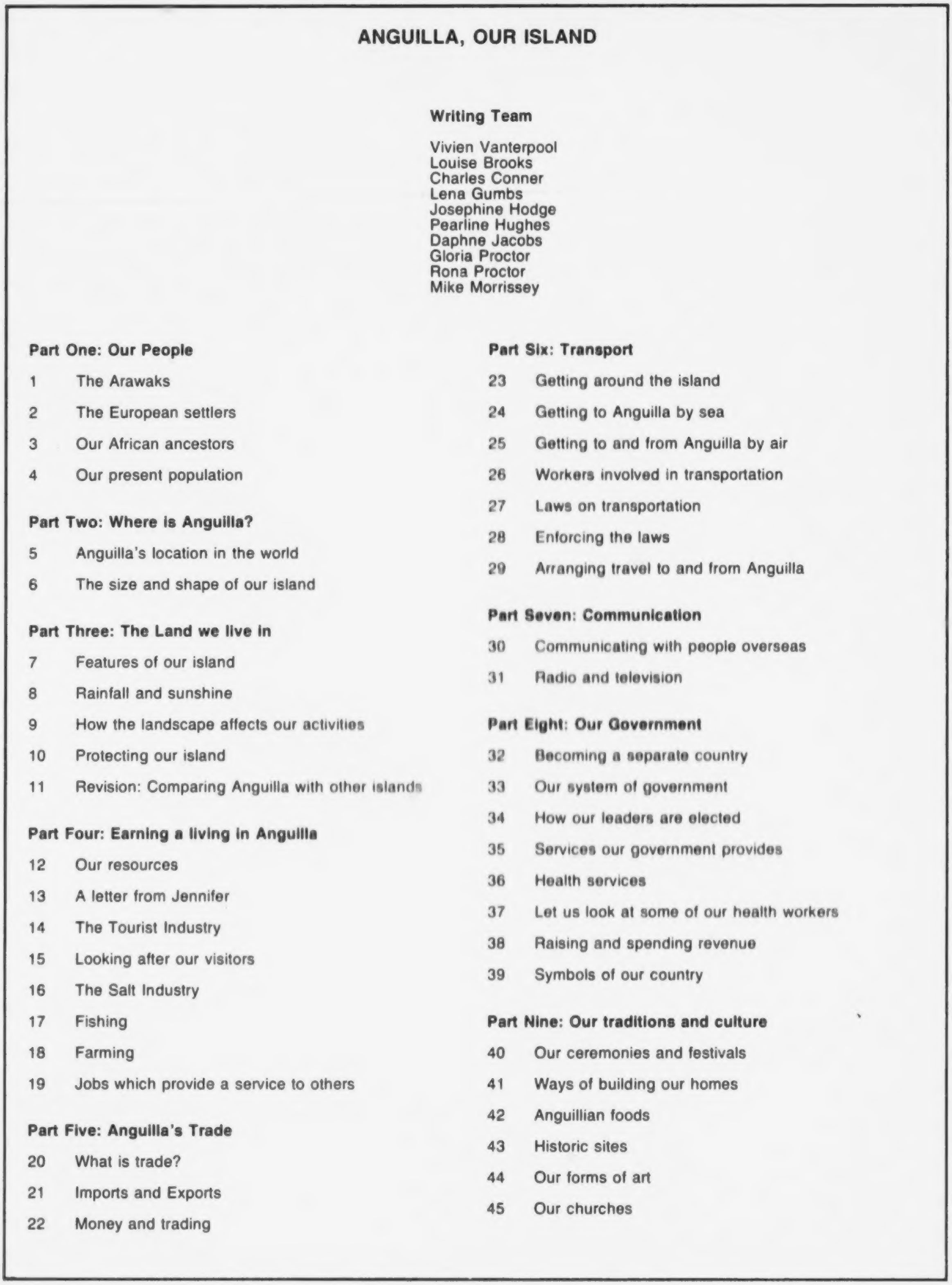
The workshops were round-table affairs. Although teachers worked alone or in pairs on their assigned topics, there was a sustained and invaluable interchange of ideas and knowledge amongst the group as a whole. Teachers worked eight hours every day for five days, and undertook "homework" assignments most nights. Somewhat reluctant and insecure at first, the level of enthusiasm and motivation among participants quickly rose as the group acquired a sense of purpose and a confidence in their own ability to achieve the goals set.

The teachers selected as writers varied tremendously in ability and knowledge, and some were quite patently unsuitable for a number of reasons. However, no one was ever removed from the group and support was discreetly added where necessary. There were no "drop-outs" from any of the workshops, and all participants completed the tasks agreed.

To make the process work, however, there had to be a very high level of interaction between teachers and the workshop director. The workshop began with a discussion of the aims of the exercise, the purposes of the textbook to be drafted, the format to be followed, and the expectations that several drafts of each and every chapter would have to be written. The format used was standard: each chapter to be relatively short, to be readable by Grade 4 pupils, and to be followed by a number of "Things to be done" by the pupils - both review questions and more creative exercises. The teachers were then set to work, the workshop director spending time with each one individually, clarifying content, suggesting approaches, shaping the overall chapter. The target set was deceptively simple: one chapter per day by each member of the group. To achieve this, many teachers had to stay up half the night to have the final draft ready for the morning.

The workshop technique succeeded in producing new manuscripts in record time for a number of reasons:

- The political and bureaucratic hierarchies were highly supportive of projects, in that products would be generated by the islanders themselves that would reflect the local aspirations for greater independence and contribute to the self-esteem of those involved;



ANGUILLA, OUR ISLAND

Writing Team

Vivien Vanterpool
Louise Brooks
Charles Conner
Lena Gumbs
Josephine Hodge
Pearline Hughes
Daphne Jacobs
Gloria Proctor
Rona Proctor
Mike Morrissey

Part One: Our People

1 The Arawaks
2 The European settlers
3 Our African ancestors
4 Our present population

Part Two: Where is Anguilla?

5 Anguilla's location in the world
6 The size and shape of our island

Part Three: The Land we live in

7 Features of our island
8 Rainfall and sunshine
9 How the landscape affects our activities
10 Protecting our island
11 Revision: Comparing Anguilla with other islands

Part Four: Earning a living in Anguilla

12 Our resources
13 A letter from Jennifer
14 The Tourist Industry
15 Looking after our visitors
16 The Salt Industry
17 Fishing
18 Farming
19 Jobs which provide a service to others

Part Five: Anguilla's Trade

20 What is trade?
21 Imports and Exports
22 Money and trading

Part Six: Transport

23 Getting around the island
24 Getting to Anguilla by sea
25 Getting to and from Anguilla by air
26 Workers involved in transportation
27 Laws on transportation
28 Enforcing the laws
29 Arranging travel to and from Anguilla

Part Seven: Communication

30 Communicating with people overseas
31 Radio and television

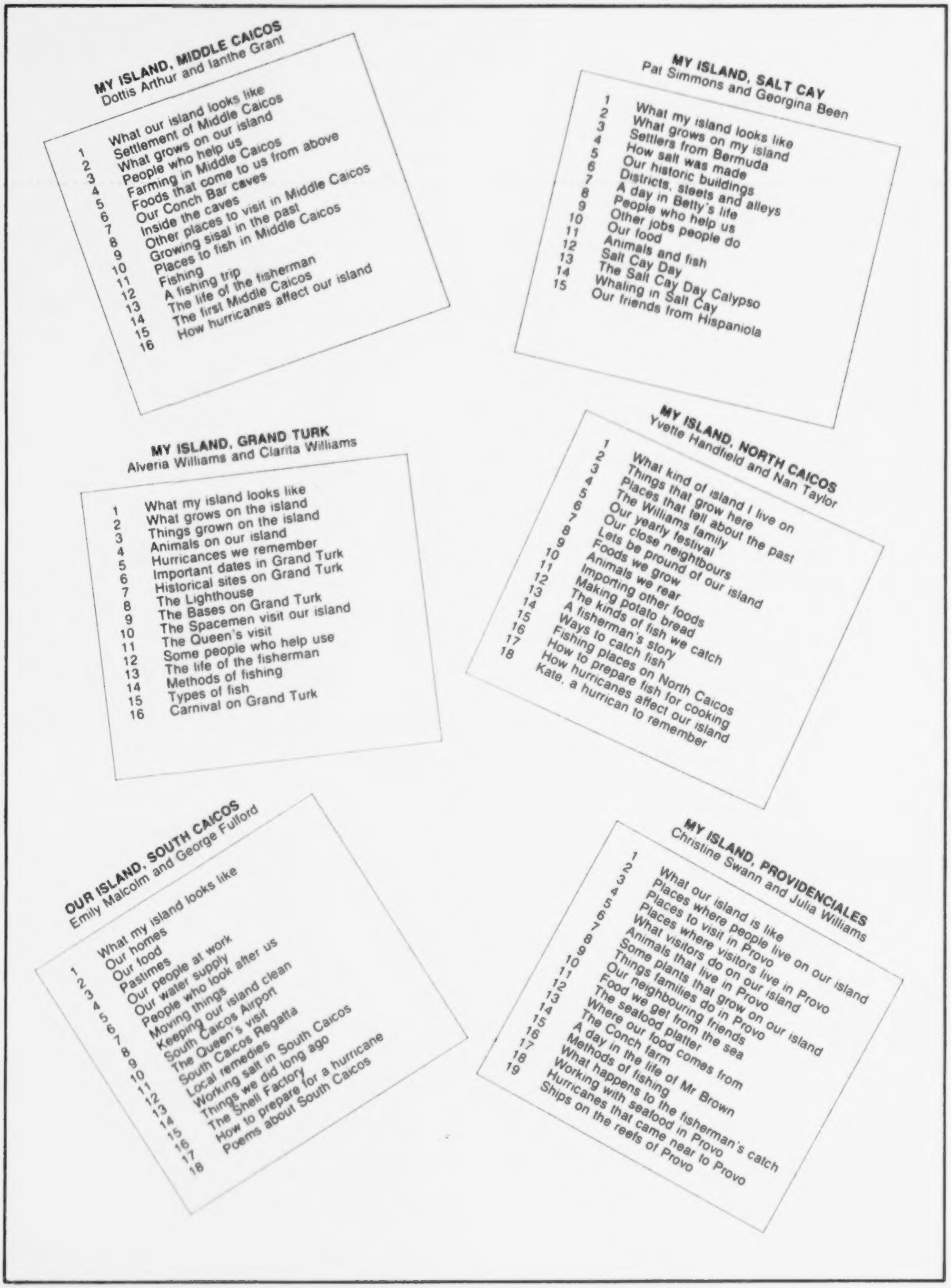
Part Eight: Our Government

32 Becoming a separate country
33 Our system of government
34 How our leaders are elected
35 Services our government provides
36 Health services
37 Let us look at some of our health workers
38 Raising and spending revenue
39 Symbols of our country

Part Nine: Our traditions and culture

40 Our ceremonies and festivals
41 Ways of building our homes
42 Anguillian foods
43 Historic sites
44 Our forms of art
45 Our churches

Figure 35.1 The writing team and contents of the primary text book: *Anguilla, Our Island.*



MY ISLAND, MIDDLE CAICOS
Dottis Arthur and Ianthe Grant

1 What our island looks like
2 Settlement of Middle Caicos
3 What grows on our island
4 People who help us
5 Farming in Middle Caicos
6 Foods that come to us from above
7 Our Conch Bar caves
8 Inside the caves
9 Other places to visit in Middle Caicos
10 Growing sisal in the past
11 Places to fish in Middle Caicos
12 Fishing
13 A fishing trip
14 The life of the fisherman
15 The first Middle Caicos
16 How hurricanes affect our island

MY ISLAND, SALT CAY
Pat Simmons and Georgina Been

1 What my island looks like
2 What grows on my island
3 Settlers from Bermuda
4 How salt was made
5 Our historic buildings
6 Districts, steets and alleys
7 A day in Betty's life
8 People who help us
9 Other jobs people do
10 Our food
11 Animals and fish
12 Salt Cay Day
13 The Salt Cay Day Calypso
14 Whaling in Salt Cay
15 Our friends from Hispaniola

MY ISLAND, GRAND TURK
Alveria Williams and Clarita Williams

1 What my island looks like
2 What grows on the island
3 Things grown on the island
4 Animals on our island
5 Hurricances we remember
6 Important dates in Grand Turk
7 Historical sites on Grand Turk
8 The Lighthouse
9 The Bases on Grand Turk
10 The Spacemen visit our island
11 The Queen's visit
12 Some people who help use
13 The life of the fisherman
14 Methods of fishing
15 Types of fish
16 Carnival on Grand Turk

MY ISLAND, NORTH CAICOS
Yvette Handfield and Nan Taylor

1 What kind of island I live on
2 Things that grow here
3 Places that tell about the past
4 The Williams family
5 Our yearly festival
6 Our close neightbours
7 Lets be pround of our island
8 Foods we grow
9 Animals we rear
10 Importing other foods
11 Making potato bread
12 The kinds of fish we catch
13 A fisherman's story
14 Ways to catch fish
15 Fishing places on North Caicos
16 How to prepare fish for cooking
17 How hurricanes affect our island
18 Kate, a hurrican to remember

OUR ISLAND, SOUTH CAICOS
Emily Malcolm and George Fulford

1 What my island looks like
2 Our homes
3 Our food
4 Pastimes
5 Our people at work
6 Our water supply
7 People who look after us
8 Moving things
9 Keeping our island clean
10 South Caicos Airport
11 The Queen's visit
12 South Caicos Regatta
13 Local remedies
14 Working salt in South Caicos
15 Things we did long ago
16 The Shell Factory
17 How to prepare for a hurricane
18 Poems about South Caicos

MY ISLAND, PROVIDENCIALES
Christine Swann and Julia Williams

1 What our island is like
2 Places where people live on our island
3 Places to visit in Provo
4 Places where visitors live in Provo
5 What visitors do on our island
6 Animals that live in Provo
7 Some plants that grow on our island
8 Things families do in Provo
9 Our neighbouring friends
10 Food we get from the sea
11 The seafood platter
12 Where our food comes from
13 The Conch farm
14 A day in the life of Mr Brown
15 Methods of fishing
16 What happens to the fisherman's catch
17 Working with seafood in Provo
18 Hurricanes that came near to Provo
19 Ships on the reefs of Provo

Figure 35.2 The titles of the six "community" books developed in the Turks and Caicos Islands.

In the Turks and Caicos Islands, manuscripts were also developed, for Grade 3 pupils' booklets about each of the six inhabited islands.

These booklets reflected the focus of the curriculum at this level on the local community. Each island is different, and it was intended that pupils would use the reading book about their own island. Each school would also have copies of the other five "My Island" books as source material. Two teachers shared the writing of each of these manuscripts, although there was considerable sharing of ideas among the various groups. The contents of these books are shown in Figure 35.2.

- the participants themselves, despite being more like conscripts than volunteers, rapidly became motivated by the goals of the workshop and the notoriety that would be accorded to them as authors;
- the workshop director, as an outsider, was able to foster a highly cooperative atmosphere by being detached, and pleading ignorance of local jealousies and animosities.

The writer's constant, if constructive, criticism of the various drafts developed by the participating teachers, seemed to create a strong working bond between director and group, and within the group itself.

Within a couple of days of each workshop's commencement, a group of somewhat diffident and insecure teachers became a determined team of writers.

The details of the workshops are recorded in the reports made to UNESCO and the various education departments (Morrissey, 1986b,c,d, 1987c). What is important in this paper is the output. At the end of each five-day workshop, a complete first-draft manuscript had been produced by a group of local teachers who had no prior experience as writers. In each case, it was the first-ever textbook written for the children of the country.

Producing the books

Each manuscript has been subjected to an intensive reviewing process involving primary school teachers who had not participated in the workshop, local education officers, resource persons in the community with specialised knowledge of one of the themes covered, and outside editors. The process has been largely directed by Local Education Department personnel, in consultation with the author. The Anguilla manuscript is now ready for publication; the others will be ready by September 1988. Funding is being sought to publish the books, as the markets are too small to interest commercial publishers. The Turks and Caicos "My Island" series will be mimeographed by the Education Department, as the market for each book is too small even to warrant the cost of offset printing.

At the end of each of the workshops, participants were asked to make evaluative comments on a number of aspects. Respondents were unanimously enthusiastic about the aims and organization of the workshops, although several commented on the physical and mental effort demanded. Participants felt the books produced would be of great value to their countries. A typical comment was "The book was badly needed in our schools and could be regarded as a document for the future. With it, our children will better appreciate, and develop an understanding of, their island and country" (a Turks Island teacher). The teachers commented that:

- they had acquired new knowledge and a fuller understanding of their own country;
- there had been awakened a new spirit of enquiry about things "local";
- abilities in framing questions and creating imaginative exercises for their pupils had been developed;
- they had worked, often for the first time, in a truly cooperative venture and benefitted from discovering their own shortcomings.

The writing workshops had therefore doubled-up in function, producing an invaluable original manuscript to benefit pupils for years to come, and simultaneously serving as an in-service teacher training vehicle.

The textbooks themselves will not be perfect: due to the *modus creandi*, the books will suffer somewhat from a lack of consistency and incrementality, as chapters have been written by various teachers who, although working as a team, could not simultaneously know what each member was writing. Nevertheless, the books will provide a landmark in the educational history of these micro-states as they are the first to be written and published for the children of these new nations. It is hoped that the books will help to strengthen Social Studies as a primary level subject and, in turn, contribute to the process of nation building.

REFERENCES

Beddoe, I.B. and Seepersad, K. (1985) "Origins and development of Social Studies Education in Trinidad and Tobage" in *Caribbean Curriculum*, 1 (1).

Cayman Islands Education Department (1984) *Social Studies Curriculum.*

Havelock, R.G. (1969) *Planning for innovation through the dissemination and utilization of knowledge*, Ann Arbor, Centre for Research and Utilization of Scientific Knowledge.

Hoyle, E. (1971) The role of the change agent in educational innovation, In Walton, J. (ed.) *Curriculum Organization and Design*, London, Ward Lock Educational.

King, R., Morris, P., Morrissey, M. and Robinson, P. (1983) *Social Studies through Discovery*, Harlow, Longman.

Massanari, K. and Miller, E. (1985) *Report of the External Terminal Evaluation of the UWI/USAID Primary Education Project*, UWI faculty of Education, Cave Hill.

Morris, P. (1976) "Social Studies Education in Jamaica", in *Social Studies Education*, No. 8.

Morrissey, M. (1986a) (Compiler) *Anguilla Primary Social Studies Programme, class one through six*, Department of Education, Anguilla, mimeo.

Morrissey, M. (1986b) *Anguilla Social Studies Workshop, 8-12 July 1986: Final Report*. Office of the UNESCO Representative to the Caribbean.

Morrissey, M. (1986c) *Turks and Caicos Islands Social Studies Workshop and other activities, 8-19 September 1986: Final Report*. Office of the UNESCO Representative to the Caribbean.

Morrissey, M. (1986d) *Turks and Caicos Islands Social Studies Workshop, 20-25 November 1986: Final Report*. Office of the UNESCO Representative to the Caribbean.

Morrissey, M. (1987a) "Trends in school geography in the post-colonial Commonwealth Caribbean", in Haubrich, H. (ed.) *International Focus on Geographical Education*, Frieburg, West Germany, in press.

Morrissey, M. (1987b) *Trends and issues in textbook publishing for Social Studies, History and Geography programmes in Commonwealth Caribbean schools*, Paper presented at ISER/UNESCO Seminar on Framework for Evaluation of textbooks, UWI, Cave Hill.

Morrissey, M. (1987c) *Cayman Islands Social Studies Textbook Writing Workshop, 23-27 March 1987: Report and Recommendations*, Office of the Chief Education Officer, Cayman Islands Education Department.

Turks and Caicos Islands Ministry of Education (1984) *Primary Social Studies Grades 1-6*.

UWI/USAID Primary Education Project (1984) *Social Studies: Core Curriculum Outline*, Teaching/Learning Experiences, Suggestions for Evaluation Procedures, Teacher Resource Material: 8-9+ Year Olds, UWI Faculty of Education, Cave Hill.

NEW!

THE GEOGRAPHY TEACHER'S GUIDE TO THE CLASSROOM

Second Edition

Edited by John Fien, Peter Wilson and Rodney Gerber, lecturers in geography and geographical education at Brisbane College of Advanced Education at Kelvin Grove.

The editors have produced a classroom guide for teachers of geography to bridge the gap between educational theorists, syllabus developers and classroom teachers.
The book is written in a practical easy to read style for busy teachers and student teachers. Each chapter contains a common structure, starting with a stimulating, scene-setting introduction. This is followed by practical 'how-to-do-it' advice on the topics. Problems that need to be considered and ways of overcoming them are outlined. Frequent examples of classroom ideas, lesson samples, short exercises, transcripts of students talking etc. are provided and up to half of each chapter is 'straight from the chalk-face'. Examples are not overly parochial and are relevant to teachers throughout the world.
This second edition is different in several ways. The content has been increased to 31 chapters, with many new chapters and most receiving a thorough revision. The physical size of the book has also been changed to a generous A4 format allowing for better layout.
The editors have recognised the need for an analysis of the nature of geography and its educational role, especially for new teachers, so this new edition begins with three introductory chapters. These are followed by sections on Teaching Strategies, Catering for Individual Differences in Students, School Based Curriculum Development, and a final chapter on Being a Geography Teacher in the 1990 s.

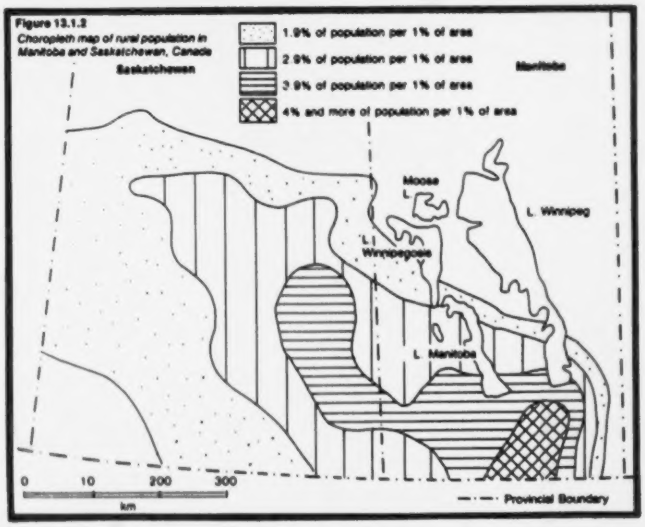


Figure 13.1.2
Choropleth map of rural population in Manitoba and Saskatchewan, Canada
1.9% of population per 1% of area
2.9% of population per 1% of area
3.9% of population per 1% of area
4% and more of population per 1% of area
Saskatchewan
Manitoba
Moose L.
L. Winnipeg
L. Winnipegosis
L. Manitoba
0
10
200
300
km
Provincial Boundary

approx. $29.95 paper
300pp approx. A4 format,
Due for publication March 1989

Available from:

MACMILLAN AUSTRALIA

VICTORIA
107 Moray Street
South Melbourne 3205
(03) 699 8922

☐ Cheque
☐ Visa
☐ Bankcard
☐ American Express
☐ MasterCard
☐ Diners Club

Order No. (where required)
Name
School/Institute
Address
Postcode

Section E

Developing skills through continuing education

36: CONTINUING EDUCATION OF GEOGRAPHY TEACHERS

Michael Williams

It is thoroughly appropriate for the continuing education of geography teachers to be included as a theme in a book focussing on the development of skills. Continuing education points to the evolution of a teacher's professional skills throughout the period of his or her career as a geography teacher. It alerts us to the notions of de-skilling and re-skilling which teachers must undergo if they and their subject are not to be rendered obsolete. It is the threat of obsolescence which is the driving power for much of the current pressure on continuing education, a threat which appears in some countries to intensify year by year. Preston James (1969), almost twenty years ago, reflected on the acceleration of change in geographical education,

"The pendulum used to swing back and forth with intervals of many decades. Now the pendulum is producing a new geography almost every year with thoroughly confusing results".

The confusion resulting from the substantive changes in the emphasis given to aspects of geography is only one source of difficulty for the classroom teacher. There is another set of difficulties emanating from changes in the pedagogy associated with the subject. Irrespective of the myriad changes which may be occurring in the teaching profession as a whole, e.g. in the conditions of service of teachers, or in the structure of schooling and the internal organisation of schools, geography teachers generally are under pressure to keep abreast of their subject and the most effective strategies to employ in their classrooms.

In an ideal world we might envisage a career ladder for geography teachers which took full account of their evolving professional needs. Such a career ladder would have three major stages: initial training, induction as a transition stage and continuing education. Each stage would have its own curricular characteristics marked by clearly stated aims and objectives, sharply defined content, appropriate teaching-learning strategies, and relevant modes of assessment. All would be carefully evaluated, formatively and summatively, to produce a dynamic and flexible structure. In these ideal arrangements teachers would be enabled to move easily from stage to stage becoming ever more competent as they improved in their knowledge and skills and modified their attitudes to all aspects of their professional work. A high value would be placed upon the concept of 'continuity' which would be enshrined as a guiding principle in the content and processes of the teacher's evolving professionalism.

We are all aware of the theoretical and ideal character of this scenario. In reality the term 'continuing education' is rarely employed in the vocational education of geography teachers. More common is the expression 'in-service education and training', usually reduced to the acronym INSET. It is possible to retain 'continuing education' for those aspects of education and training which are narrowly focussed on changing the teacher's geographical knowledge, skills and attitudes. The focus would be sharply upon the maintenance and improvement of the teacher's geographical expertise and the sustenance of his or her commitment, enthusiasm and conviction for the subject as such. The relevance of geography as a medium for pupil education would not be a primary matter of concern within this notion of continuing education. Continuing education would be addressed to the academic side of the teacher's persona, seeking to fulfil the potential of the individual as geographer, maximising his or her development as a scholar and practitioner in the community of geographers. In this, the geography teacher would be a participant in the community of geographers, contributing to the evolution of the subject in that part of the community in which he or she is located. It can be seen that the insertion of 'geographical' into 'continuing education' produces 'continuing geographical education' and this term needs to become part of the language of academic and professional discourse in the field of vocational education and training.

The term 'INSET' could then be retained for the classroom-related aspects of education and training. The bridge would be between geography teaching and curriculum development. Continuing geographical education derives its impetus from changes taking place in the research laboratories and studies in institutions devoted to research in geography. INSET derives its impetus from research undertaken in the field of education. Organisationally, there are many gains for geographical education in the establishment within institutions of higher education of structures which bring closely together educationists and geographers to plan, implement and evaluate programmes for both continuing education, as defined above, and INSET, seen as something discrete. There is likely to be broad agreement in the community of geographers that 'pure geographers' in higher education who address audiences of geography teachers about aspects of the subject are likely to be distanced from the issues confronting those teachers in their day by day work.

Similarly, educationists addressing audiences of geography teachers may lack understanding of the specific concerns of these specialists. There is a need for specialist geographical educationists who themselves have undergone appropriate professional training to gain the skills required for continuing education and training. Initial training of geography teachers is largely the responsibility of geographical educationists, engaged as specialists (See Marsden, 1984 for models of pre-service training). To reduce the possibility of obsolescent geography being taught in schools, more attention must be paid to the education and training of specialists in continuing geographical education and INSET who will be able to provide the relevant experiences for classroom teachers of geography.

Continuing education and curriculum development

It is usually extremely difficult to trace the linkage between a change in a teacher's classroom behaviour and the stimulus which generated the change. Certainly, there are some obvious connections between pressure emanating from outside and changes taking place within a classroom. A radical change in examination arrangements (e.g. the merging of two public examinations, the General Certificate of Education and the Certificate of Secondary Education to produce the new General Certificate of Secondary Education in England and Wales) or national syllabuses will lead to a rapid change in teacher behaviour. More subtle is the translation of changes in geography, resulting from research activities, into school practice. It has been this translation which has exercised the minds of those pioneers of reform in geographical education who became responsible for funded curriculum development projects in recent decades. These projects may be viewed as stimuli to the continuing education of geography teachers. While being themselves external agents, gadflies stimulating responses from their chosen audiences, they were themselves responding to stimuli derived from various sources. These links are simply illustrated in Figure 36.1. This much over-simplified diagram highlights four stages: stimulus, development, dissemination and institutionalisation. The initial stimulus may be derived from two broad areas: changes in geography and changes in pedagogy. The stimulus is followed by a process of curriculum development with subsequent INSET.

This sequence can be detected in the stages of the American High School Geography Project, which captured the attention of geographical educationists who sought to replicate some of its features elsewhere. The project had four phases which were initiated in 1961:

Phase 1: The compilation of an advisory paper produced by leading scholars in geography.

Phase 2: The development of teaching materials and units of instruction by a group of seconded school teachers.

Phase 3: The design of a whole geography course to incorporate the concepts and skills identified earlier.

Phase 4: The preparation of complete geography courses.

The flavour of the High School Geography Project can be gained from a terse paragraph about intended outcomes written by Gilbert White (1965). He quotes from one of the advisory papers produced as part of Phase 1. The outcomes are grouped under three headings: attitudes, knowledge and skills. There are six summary topics for attitudes: the winning of knowledge, seeing things for oneself, location and distance, the uniqueness of places, the natural environment and world societies. Under knowledge there are four principal concepts: map representation, the region, man-land relations and spatial relations, together with four sets of facts relevant to: place locations, order of magnitude, world patterns and content of area. There are six sets of skills including map reading, map interpretation, comprehension of geographic literature and the production of creative geography.

It is worth recalling, if only briefly, the scope of these intended outcomes which stemmed from the then current concerns of representatives of the academic community of geographers in the United States. They recur in the aims of such diverse curriculum development projects in geography as those in the United Kingdom, the Federal Republic of Germany and Australia. The outcomes eventually found expression in statements of objectives related specifically to changes in the behaviour of high school students. Thus Helburn (1968) in a progress report of the project wrote:

"Gradually, a commitment to the following general objectives has evolved.

Students will work with a representative variety of facts or generalizations from all the regions of the world ....

Students should understand certain basic abstractions...

Student training should focus on four skills objectives ....

As a result of working with the Project's materials, the student will be able to ask - indeed, will want to ask - a series of questions that will help him to understand the contents of the world".

These statements of objectives highlight the shift from changes in geography to changes in pedagogy. They followed a significant statement about the continuing education of teachers:

"At the same time that the High School Geography Project was being developed, its objectives were being debated by scores of geographers and hundreds of teachers" (Helburn, 1968).

Returning to Figure 36.1, notice the reference to centralised agencies and teacher participation. In our brief comments on the High School Geography Project we must emphasise the role of seconded teachers in Phase 2 of the project's programme. They were engaged in the development of teaching materials and units of instruction. Hundreds of other geography teachers assisted

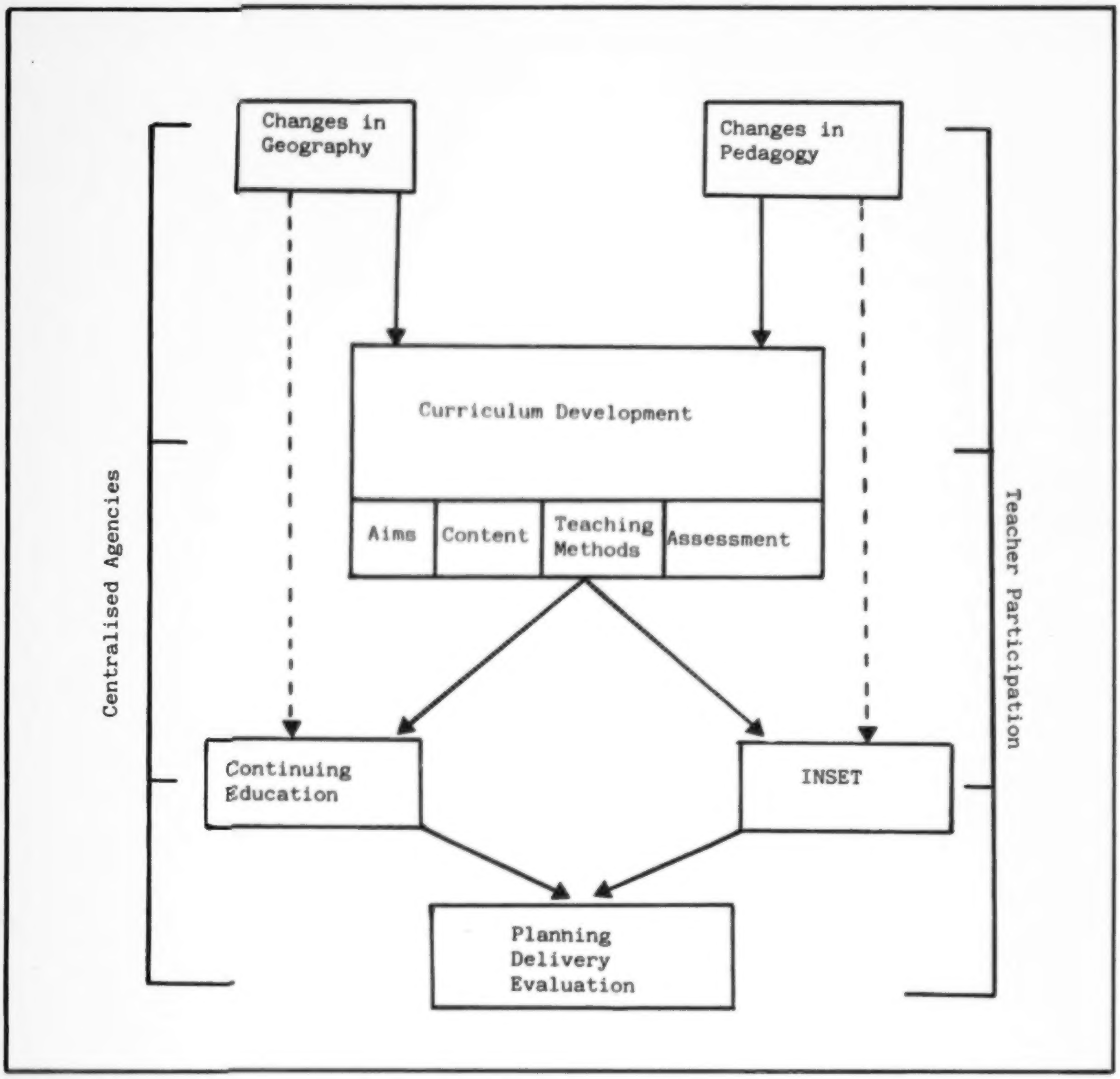


Figure 36.1 Continuing education, INSET and curriculum development

in the project's development work. We must also emphasise that by their participation, formal and informal, in the work of the project these teachers contributed to their own continuing education.

Curriculum development projects are prime continuing education vehicles for teacher participants. Conventionally, they usually have built-in dissemination strategies which are synonymous with continuing education and INSET.

The difficulties of disseminating the products of a geography curriculum development project were highlighted by Tolley and Reynolds (1977) in their account of the Schools Council's Geography 14 - 18 Project. In particular, they asserted that "Proposals for curriculum change have generally under-estimated the disincentives to teachers under day-to-day pressures, to put new ideas into practice .... Innovations which entail new roles and teaching skills, however, are difficult to adopt and sustain even by able and experienced teachers so that effective cirriculum renewal at 14 - 18 is largely a matter of geography teachers themselves developing a new professionalism".

"Enhanced professionalism" was a serious concern of the Geography 14 - 18 Project team (Hickman, Reynolds and Tolley, 1973) and this was enshrined in three interdependent elements in their development strategy: a new examination which would "attempt to break the vicious circle of curriculum underdevelopment in geography at 14 - 18"; the establishment of a system of in-service support to help teachers in departmental teams to plan and implement new geography curricula; and the production of a variety of curriculum materials. This three-fold strategy hinged upon a large degree of freedom for geography teachers within schools to determine the kind of geography they wish to teach and the teaching methods they wish to employ. It assumes a level of independence and autonomy in curriculum decision-making in geography which is denied to teachers in most countries, especially those where the role of centralised agencies in changing geographical curricula (See Figure 36.1) is far more important than that of the school.

The tension between the professional needs of geography teachers as perceived by central agencies - governments, inspectorates, examinations boards, curriculum development project teams, curriculum planners and subject associations - and those perceived by individual teachers themselves is one which recurs through the literature of continuing education. As curriculum development projects in geography well illustrate, there is also the tension between the demands of the subject itself and the pedagogical demands of the classroom environment. One way of making sense of these conflicting pressures is to consider briefly the notion of the geography teacher as a professional. We can then return to the concepts of planning and delivery of continuing education and INSET shown in Figure 36.1.

Geography teaching and professionalism

At the heart of the new professionalism advocated by Tolley and Reynolds are concepts of teacher participation in curriculum development, teacher ownership of innovations and teacher freedom to choose and experiment with curricula. They envisage the professional as a qualified, experienced geography teacher with the capacity to make a significant contribution to curriculum management within a school. At the outset of any discussion of professionalism in school geography we need to recognise that not all countries include geography in their curricula and even in those countries where the subject occupies a prominent place in the curriculum not all the teachers who teach the subject have been trained for this role. The teaching of geography by non-specialists presents one of the most important challenges for those persons responsible for the continuing education and INSET for geography teachers.

In his synthesis of what constituted a professional, Cogan (1953) placed 'full-time occupation' as the first of the five characteristics which he identified. For those non-specialist teachers of geography the provision of continuing education represents their initial training. This confusion between initial training and continuing education poses serious difficulties when innovations are being introduced. For the full-time geography specialist it can be assumed that any innovations will fit into existing schema so that the processes of accommodation and assimilation will facilitate experimentation and implementation. For the non-specialist there exists no such schema and this requires specially designed strategies to assist the teacher.

It was the possession of a specialised body of knowledge in which practitioners participate as part of the community of scholars which constituted Cogan's second characteristic of the professional. The third was a service orientation towards clients and this poses no particular problem for the geography teacher, specialist or not. Having educational preparation and standards is the fourth characteristics. As we have indicated, the non-specialist geography teacher is distinguished by a lack of appropriate preparation. However, this item also alerts us to the quality of training provision, both pre-service and in-service, for specialist geography teachers. Marsden (1984) points to the storm clouds overhanging many educational systems:

"Where, either through lack of resources resulting from economic under-development or, increasingly frequent in so-called 'developed' economies, a policy of government 'cuts', there is a threat to the fabric of teacher education, not least through the over-burdening of an already depleted work-force, and the demoralizing of students through limited job prospects, heavily clouding over what hitherto had been a relatively bright picture of geography teacher education establishments in so many countries that had achieved success in their own sphere and ranked also as among the more progressive influences in the general area of curriculum change".

If pre-service geographical teacher education is threatened in the way Marsden suggests, then how much more vulnerable is in-service teacher education? The weaker pre-service education becomes the greater is the need for an adequate compensatory in-service education. As Cogan (1975) wrote:

"The established professions require the practitioner to continue his education throughout his entire professional life .... A similar requirement binds teachers into programs of in-service education. But for teachers, these programs must in addition remedy the severe insufficiency of pre-service education .... The tasks of helping teachers to improve their professional competencies must be continued on the job, that is, through an inservice program that welds theory, research and practice continually and incrementally rather than episodically".

The fifth of Cogan's characteristics of the professional was the existence of a professional association which sets entry criteria and monitors the quality of service rendered. That there is no shortage of professional associations for geography teachers in some parts of the world is evident in the work of the European Standing Conference of Geography Teachers' Associations and the contributions made by national associations world-wide to promoting the study and teaching of geography. However, none of these associations has the authority to set entry criteria to the profession. They generally seek to monitor and improve the quality of service rendered. We shall return to the role of geography teachers' associations as providers of continuing education and INSET later in this account. For the moment we wish to emphasise only the partial nature of the concept of the 'professional geography teacher'. The degree of professionality varies from country to country. Critical in this regard is the quality of pre-service preparation, the opportunities in teaching for a full-time single subject teaching role and the provision for effective continuing education with specific reference to geographical education.

Associated with this professionalism are the career structure and conditions of service of the specialist geography teacher. Earlier reference was made to the three stage pattern of pre-service, induction and continuing education. Clearly, this is only a skeletal pattern. To it must be added the range of incentives and rewards for teachers to engage in professional development, including promotional rewards coupled with improved status reflected in responsibilities, duties, salary and time available for activities in school other than teaching. Not all countries have an incremental career structure for geography specialists. Some permit teachers to change career paths in mid-stream so that a geography teacher may be diverted internally to new functions of a managerial, pastoral or instructional kind within a school or to a range of other types of employment outside the school, e.g. advisory, inspectoral, research or teacher training roles. Pressures for professional improvement take many forms and vary from country to country depending upon the administrative and organisational contexts of particular educational systems. Where this improvement is planned the process of planning is likely to proceed along a stylised pattern and it is to this planning process we can now turn our attention.

Planning for continuing education and INSET

Continuing education as a planned activity is no different in its essential characteristics from any other form of vocational education. The principal stages are illustrated in Figure 36.2. Starting with the identification of geography teachers' professional needs a number of stages can be delimited, all of which can be evaluated and all of which can be located within the broader context of managed change.

It would have been helpful at this point to have been able to refer to thorough studies undertaken in various countries of the application of this stage model to geographical continuing education. Unfortunately, such studies are not available and so this brief review must draw its evidence from more general literature.

1. Identifying needs

To some extent statements of professional needs are implicit in the journals and handbooks published specifically for geography teachers. Journals such as *Teaching Geography* (England and Wales), the *Journal of Geography* (USA), *Geographical Education* (Australia) and *Geographie und Schule* (Federal Republic of Germany) contain articles advising geography teachers how to conduct their lessons and improve their levels of competence in various skills associated with the subject. Typically, they contain thought-provoking articles, reflections on contemporary issues, guides to improved practice and advice about sources of information and professional activities. Editors and authors seek to be sensitive to the needs of their readers. These publications provide self-help materials for teachers.

To facilitate more effective planned continuing education and INSET for teachers, close attention must be paid to a system of needs identification which indicates as precisely as possible teachers' needs as individuals, as members of a functional group within a school, and as members of a whole school staff, and as members of the teaching profession. Recent international studies of INSET have pointed to the importance of these layers within the teacher's experience (Blackburn and Moisan, 1987; Goad, 1984 and Hopkins, 1986). The identification of needs within the various layers can be viewed as an INSET activity in itself, rather like peeling back the skins of an onion to uncover more and more needs as they are identified. The problem is partly in determining how best to define the needs, arranging them in appropriate hierarchies and then prioritising them. There is also the problem of determining who should engage in identifying teachers' needs. It is clear that the geography teacher's response is likely to be different according to who is engaged to undertake the task. Government inspectors or employers are likely to obtain quite different responses from those given to friends and trusted colleagues.

Bolam (1982) commented:

"A widely recognised problem in all organisations is that of reconciling the potential conflict between meeting the requirements and goals of the organisational system and satisfying the needs for self-fulfilment of the individual member of an organisation".

The conflict inherent in this dichotomy is reflected in the identification of teachers' needs associated with the introduction of new technologies, especially microcomputers, into secondary school geography teaching (Barr and Williams, 1983; Fox and Tapsfield, 1986). Writing about INSET, Barr and Williams comment:

"We, as course designers, must take into account the potential diversity of our students. At its simplest this diversity is reflected by the three responses we meet from geography teachers attending our courses. Some are actually hostile and extremely pessimistic about the role of the computer. They see it as yet another indignity that is being heaped upon them by the innovators who have already all but destroyed geography as they knew it. The second response is one of caution and sceptism, this is frequently the most healthy response. The third response is one of intemperate enthusiasm where the novelty of the computer overshadows any geographical value that programs may have. It is only by anticipating the interplay of knowledge, skills and attitudes in one's

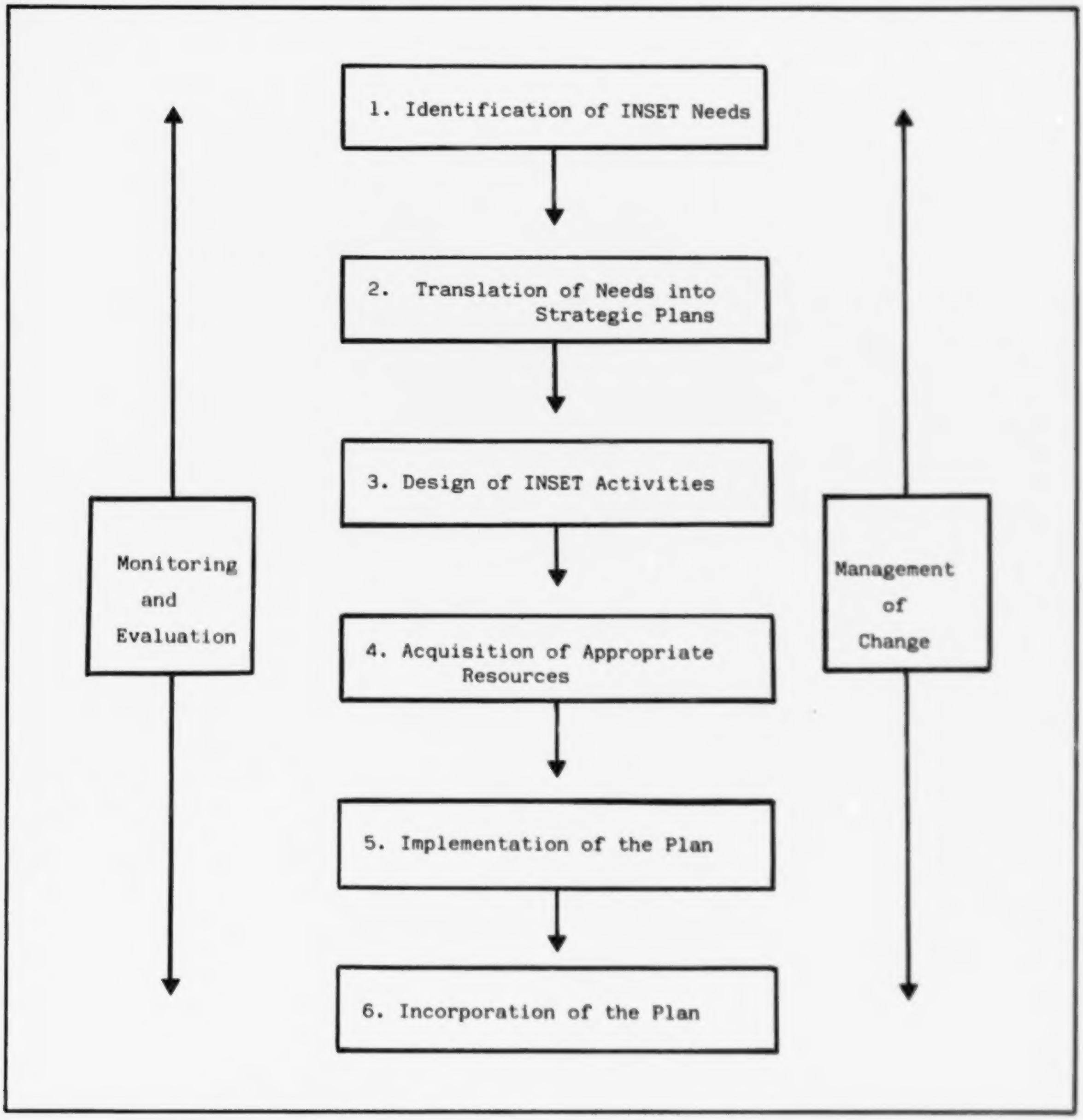

1. Identification of INSET Needs
2. Translation of Needs into Strategic Plans
3. Design of INSET Activities
4. Acquisition of Appropriate Resources
5. Implementation of the Plan
6. Incorporation of the Plan
Monitoring and Evaluation
Management of Change

Figure 36.2 Stages in INSET planning

students that an appropriate course can be designed".

It is to make this anticipation more realistic that systems have been designed for needs identification. These systems have been the subject of much discussion in England and Wales since the introduction by the Department of Education and Science (the equivalent of a Ministry of Education in most countries) of new funding arrangements for INSET. Since 1986 the local education authorities, who are the employers of teachers in the state sector, are required to submit INSET plans to the Department for approval. If approved, then funds are allocated. Evidence of needs identification must be part of the submission. In this particular context a number of key questions must be answered before any needs identification techniques are employed:

a) Whose needs are to be identified - individual teachers; functional groups (e.g. geography departments); whole schools; consortia of local schools?

b) Who should be responsible for the needs identification - individual teachers, headteachers, committees of teachers, teacher unions, professional association, local education authority staff, local and national inspectors?

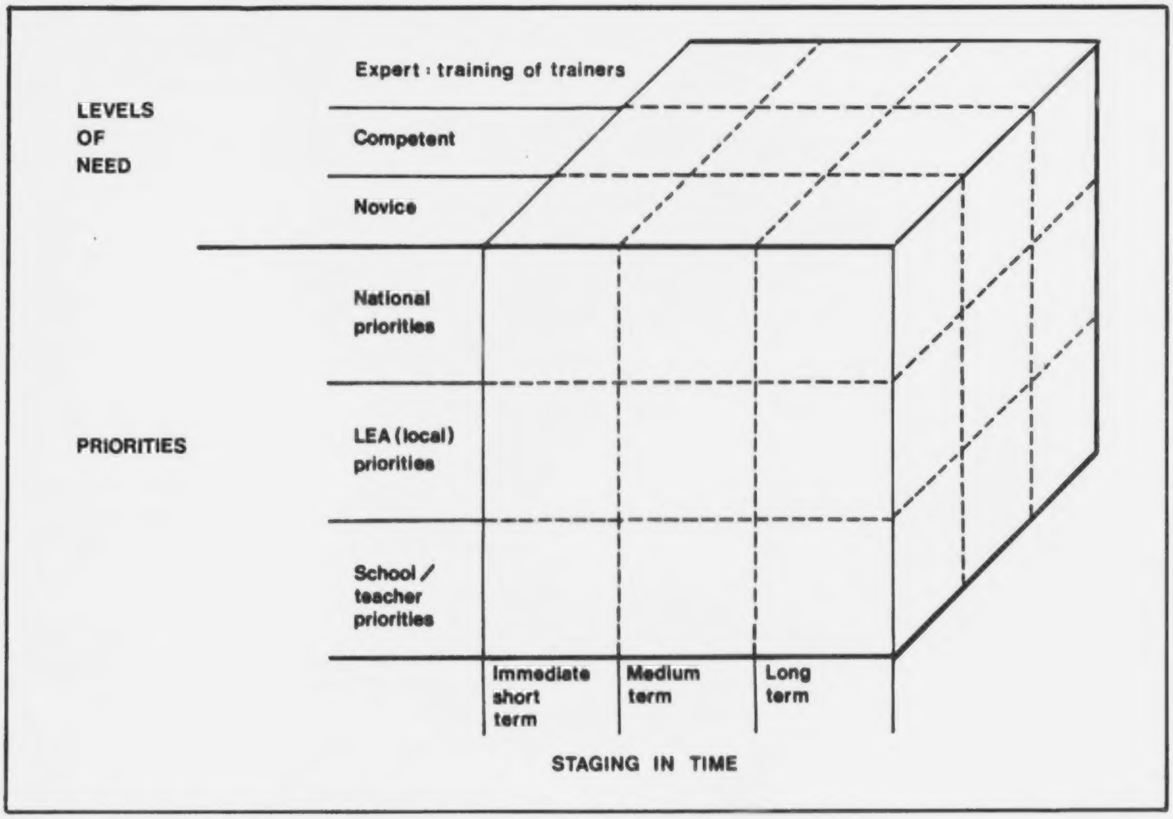


Figure 36.3 Aspects of needs identification

c) How will the idea be introduced - impersonally by letter, through staff discussions, within staff development programmes?

d) What methods will be used to collect data - informal discussions, survey questionnaires, quality circles, interviews?

What has become clear so far in England and Wales is that geography teachers need assistance in articulating their needs. They also need guidance in ensuring that their needs are not overlooked by INSET decision-makers who may not give geography a high priority vis-a-vis other school subjects. As a contribution to alerting geography teachers to the changing arrangements for INSET Williams (1987b) devised the 'INSET needs cube' (Figure 3). This illustrates three interwoven dimensions of need identification: levels of need; priorities; and stages in time. As yet, there is no public evidence of any systematic attempts to identify the needs of geography teachers in England and Wales and this renders the next stage of INSET planning difficult.

2. Translation of needs into plans

Plans for continuing education and INSET are strategic documents which indicate the policy preferences and structures for delivering, monitoring and evaluating INSET. Consideration of levels of need, local, regional and national priorities and the imperatives within known time constraints assists in the construction of aims which is the first step in planning. For geography teachers these aims fall into four broad groups:

a) the extension and up-dating of academic knowledge and skills;

b) the changes of attitudes towards aspects of geographical education, e.g. gender and race related issues, international understanding, and the new technologies;

c) the extension and up-dating of pedagogic knowledge and skills, e.g. new modes of assessment and new approaches of fieldwork;

d) the fostering of personal and interpersonal development, e.g. to facilitate departmental development and team teaching.

Some of these were incorporated into a framework for in-service expansion prepared by Hall (1976). The framework had four principal components: development of technical skills (related to resources, management, and professional and subject skills), enlargement of data sources (projects and other media), extension of learning strategies (learning process and achievement), and changes

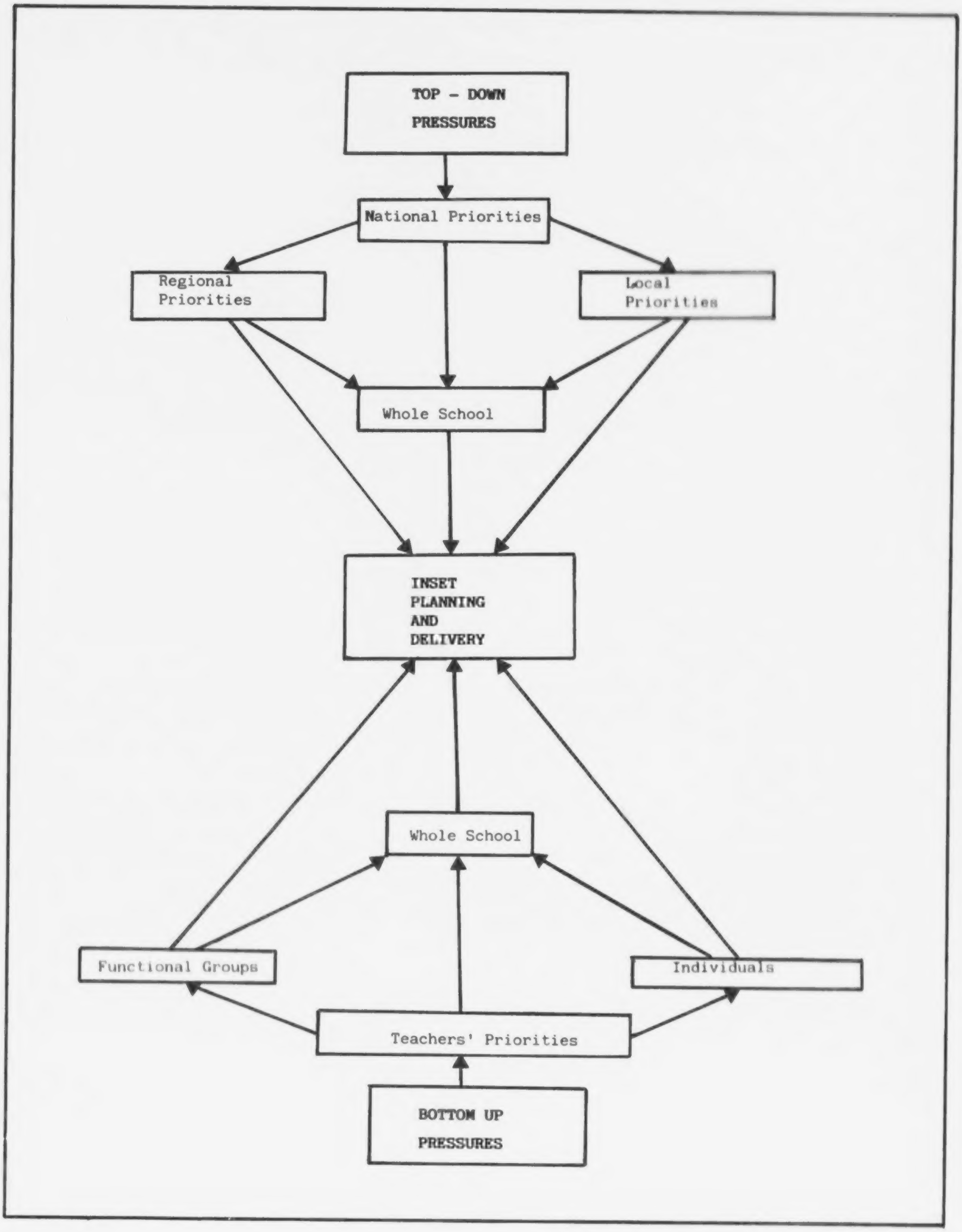


Figure 36.4 Pressures on INSET

in professional outlook, attitudes and perceptions. Similar statements of aims have been produced as parts of strategic plans by curriculum project teams who have addressed national audiences of geography teachers.

From statements of aims the next step is the selection of appropriate content, teaching and learning strategies and, where relevant, modes of assessment. These are the familiar stages in the objectives-based rational models of curriculum planning for schools which can readily be applied to be curricula of continuing education and INSET.

3. The selection of content

An important issue in the planning process is determining who is responsible for any plan. Some people would argue that it is vitally important for teachers themselves to be active participants in the planning and delivery processes as well as being the recipients of continuing education and INSET. The tensions between a bottom-up pressure stemming from the direct involvement of teachers and a top-down pressure stemming from the interests of central agencies are illustrated in Figure 36.4. The strength of central agencies is reflected in Haubrich's (1982) account of geographical education in the Federal Republic of Germany. He writes:

"The 'freedom' of curricula in the early 1970s has come to an end. Most of the Laender want a rigid fulfilment of the new curricula not only from newly published textbooks but also from the daily work of the teacher. The old syllabi have been changed into more detailed curricula containing suggestions and finding instructions".

The notion of binding instructions, i.e. teachers must teach an externally defined geography using teaching materials which have been approved and teaching methods which have been recommended by external agencies is a familiar one to geography teachers in many countries. It stands in sharp contrast to those teaching situations where teachers can devise their own syllabuses, teaching methods and modes of assessment and where schools can decide individually whether or not to include geography in their curricula. The educational system in England and Wales has been a prime example of this latter situation, though this may change quickly and radically in the future if government proposals for a national school curriculum are implemented.

The content of continuing education programmes for geography need not necessarily reflect current curriculum pressures on geography in schools. Continuing education may be viewed as a private matter for the individual teacher who may wish to pursue the study of geographical themes and topics which have very little bearing on his or her day-to-day teaching. Thus geography teachers may develop interests in regional study more related to recreational and travel interests while engaged professionally in teaching local and systematic geography to pupils in school. To that extent the geography teacher is no different from any other member of the public who may, for example, attend evening classes provided by extra-mural or extension departments of universities or other institutions of higher education or follow award-bearing courses offered by correspondence colleges or institutions offering courses by television or radio.

The content of INSET courses are likely to reflect the priorities of INSET providers and those who fund INSET provision. In some countries INSET is compulsory following the revision of curricula, courses and syllabuses by central agencies. In these circumstances the content is pre-determined. Teachers need to be informed formally about the scale and significance of the changes, the interpretation of the revisions and advised about how they should modify their teaching arrangements. In other countries the content is largely in the hands of geography teachers' associations which either make provision on demand or provide a variety of continuing education and INSET activities relying on the advice of experts within their membership to guide their decision-making. In some countries teachers themselves determine the content, and, especially in those systems where school-based and school-focussed training is in vogue, teachers may be responsible for all aspects of the planning process.

4. Designing continuing education and INSET activities

It is important to notice the choice of the word 'activities' rather than 'courses' in this sub-title. For many geography teachers 'going on a course' is seen as the beginning and the end of their professional development. It is important to keep courses in context since there is a wide array of alternatives available for the delivery of continuing education and INSET.

There is a tendency in national and international reports to reflect on the inadequacies of provision and the small number of teachers who participate in professional development subsequent to initial training. Goad (1984) in a concluding chapter following a series of case studies of 'lifelong' education of teachers drawn from Australia, El Salvador, France, India, Ivory Coast, Jordan, Lesotho, Philippines, Poland and Mexico commented:

"The education service itself is frequently beset by problems such as a shortage of teachers, the under-qualification of teachers, producing an up-to-date curriculum, increasing the relevance of school to its social milieu, the development of a future perspective, and not the least, encouraging the personal development of teachers, particularly with regard to the promotion of their capacities as lifelong learners".

Goad went on to suggest that 'Self-directed learning is the most common single theme which indicates a movement towards the conditions of lifelong education'.

Blackburn and Moisan, in a recent (1987) report on the in-service training of teachers in the member states of the European Community, state:

"The main problem which all countries have in common is the involvement of a sufficient number of teachers in in-service training to make the process effective. It is difficult to gather precise comparative information about the percentages of teachers who take part in in-service training, but in all countries there is a significant number who never participate".

The principal difficulty in discussing the extent of take-up of continuing education and INSET activities is distinguishing between public participation in formal courses and private participation in activities other than courses. In this latter category we can include active participation in the work of geography teachers' associations, curriculum development projects, the work of examinations boards, private reading, listening to the radio and watching television.

The latter activities in this list of examples are part of the distance learning strategies which are becoming increasingly familiar to geography teachers in some countries. Other strategies include self-instructional and tutor supported study guides; study letters; telephone tutoring; teleconferencing; and the use of videotapes and audiotapes. It is not intended to discuss the potential of these strategies for continuing education and INSET in this overview. We would only comment that, as yet, insufficient attention has been paid to them in the literature of geographical education.

The extent of involvement of geography teachers in INSET associated with curriculum development is also difficult to gauge. Teachers are usually active members of central project teams, they may be employed in pilot schools engaged in experimental work and they may be actively involved in dissemination activities. In some countries, notably England and Wales, the role of seconded teachers as advisory teachers and local project co-ordinators has resulted in the creation of a cadre of intensively trained geography specialists who have much to contribute to the professional development of their colleagues. The term 'consultant' has been loosely applied to such specialists but, as Eraut (1978) has indicated, it covers a range of activities. He listed eleven consultancy roles:

a) The expert
b) The resource provider
c) The promoter
d) Career agent
e) Link agent
f) Inspector-evaluator
g) Legitimator
h) Ideas person
i) Process helper
j) Counsellor
k) Change agent

The paramount advantage of the consultancy mode of delivery is that it gives the geography teacher an individualised, personalised service without the teacher having to be released from the classroom. It minimises the interruption to the teacher's daily cycle of work and maximises the attention paid to the teacher's own teaching circumstances.

The word "course" is also loosely used to cover a range of activities which include conferences, seminars, workshops, field excursions, laboratory classes and lecture series. The distinction between one-off short courses and extended award-bearing courses in fundamental. Both may be described and analysed according to the same criteria including:

a) who initiated the course?
b) who designed it?
c) who attended it?
d) who taught it?
e) who validated it?
f) who evaluated it?
g) what were the course aims and objectives?
h) what was the content?
i) how was it taught?
j) what was learned?
k) how was the course followed up?
l) what were the short and long term consequences?
m) was it cost-effective?
n) where was it held?
o) when was it held?

It is rare to find accounts of short courses in the literature since by their very nature, for the course organisers, tutors and participants they have the character of ad hoc events, rarely repeated in terms of content, methods, location and audience. Long courses, especially when they have associated awards such as diplomas, certificates and degrees, are more likely to be repeated. Such a long course was described in detail by Hall (1976).

5. Aspects of implementation

In some countries responsibility for implementing continuing education and INSET plans rests firmly in the hands of departments of geography and departments of education in institutions of higher education. A good example of this is Denmark where much responsibility for this work rests upon the Royal Danish School of Educational Studies. In other countries the responsibility is held more diffusely and subject teacher associations and teachers' centres and the schools themselves play major roles.

6. Geography teachers' associations

In the evolution of school geography the distinctive and influential role played by geography teachers' associations is often taken for granted. So familiar are the associations to their members that their functions in continuing education and INSET are rarely described in language familiar to specialists in those fields. Geography teachers' associations as providers of continuing education and INSET deserve a higher profile.

Gerber (1987) describes the role of the state geography teachers' associations in Australia and the co-ordinating functions of the Australian Geography Teachers' Association:

"The provision of continuing education for geography teachers is not a major role for the main employing authorities. Therefore, the geography teachers' associations fill the gap by either mounting their own continuing educational experiences for teachers or by supporting the actions of groups of teachers who wish to organize these activities themselves. State conferences are still useful means of bringing geography teachers together to discuss geographical education. However, since education is regionalised in most states, the most effective activity is often one which is organised in a particular region specifically for the teachers in that region. Sometimes, one or more 'outside' experts are supported to attend and to provide leadership at such a meeting. Often all the teachers who wish to attend such meetings are unable to obtain a release from their teaching duties. This means that the ones who do attend should play a very active part in the dissemination of the contents of the meeting. It is difficult to ascertain the effectiveness of this method of professional development for geography teachers".

In similar vein, Williams (1984) recorded twelve activities of the Geographical Association in England and Wales which contributed to the in-service education of the members:

a) Publication of *Teaching Geography* and *Geography*
b) Publication of books and pamphlets
c) Newsletters
d) Branch activity
e) Annual Conference
f) Regional conferences
g) Section committees
h) Working groups
i) Working parties
j) Board for the Validation of INSET
k) Library and information service
l) Links with cognate bodies

To this list could be added the links between the Geographical Association and other geography teachers' associations, particularly well illustrated by the work of the European Standing Conference of Geography Teachers' Associations. The Standing Conference has been meeting at regular intervals and it seeks to provide an international service partly through its publication EUROGEO and partly through its close links with such international bodies as the European Community and the Council of Europe. The creation of networks of influential specialists in geographical education has grown through the Standing Conference as well as the work of the Commission of Geographical Education of the International Geographical Union. Through these networks publications have been generated, international conferences organised and members of the associations have participated in each other's activities.

7. Teachers' centres

At a local and regional level there exist in some countries teachers' centres which have been established specifically to promote the professional development of teachers. It is difficult to generalise about their functions and effectiveness. However, they generally stand in a middle position between conventional providers of INSET and the school teachers, fulfilling a brokerage role at a location where continuing education and INSET activities can conveniently be delivered. In some countries these centres have a non-specialist function with regard to school subjects, e.g. the centres located in France and Sweden. In other countries there are specialist centres of immediate relevance to geography teachers, e.g. urban studies centres, development education centres, field study centres and heritage centres such as those located in various parts of the United Kingdom. It was through specialist teachers' centres that the educational use of microcomputers was disseminated in the United Kingdom. Midgley and Fox (1986) record:

"MEP (Microelectronics Education Programme) has created fourteen Regional Information Centres covering England, Wales and Northern Ireland. It is hoped that, with all schools being within reach of one of these centres, the dissemination of knowledge and materials relevant to the new technology will be more effective and more rapid. One of the functions of each centre is to provide in-service training for existing teachers. Indeed, for schools to take advantage of the Department of Industry scheme for 'microcomputers in schools', two of their staff have to attend computer familiarisation courses. Generally speaking, INSET courses have absorbed much of MEP's energy and a great many teachers have attended courses relevant to their subjects".

In a comparative study of teachers' centres in which evidence was gathered from Australia, the United States of America and the United Kingdom, Howey (1980) pointed to the emphasis in teachers' centres on democratic and 'grass roots' forms of participation, stating that teachers were not only involved in the identification of needs and interests but also they were involved in the planning and conduct of INSET as well. It is not clear whether teachers' centres are growing or declining in numbers and influence. Certainly, more attention needs to be paid to this sector of continuing education and INSET in the literature of geographical education.

8. School-based continuing education and INSET

We have already referred to the small numbers of teachers who participate in formal professional development activities. Many teachers do not wish to interrupt their teaching in order to participate in these activities. Others are prohibited by teacher union requirements from partricipating in activities organised outside normal teaching hours. Others cannot attend out-of-school activities for logistical reasons. Distance alone is a key factor and cost is another. If continuing education and INSET activities are to be made available to the majority of geography teachers close attention must be paid to strategies which bring activities into individual schools and even into individual classrooms. Reference has already been made to distance learning strategies and to the work of consultants. Self-help activities undertaken by geography departments in secondary schools have been suggested by Tolley and Reynolds (1977). These activities include discussions, demonstration, experimentation, feedback and follow up. For the teacher the advantages are self-evident. The activities can be addressed to highly specific needs and interests, they can be accommodated within the working day with a low cost in time and money, they make use of existing resources and expertise within a school, and they can be evaluated in instrumental terms. There is a danger of such activity becoming too parochial, though few schools are able to operate comprehensive self-help schemes without recourse to external agencies.

9. Incorporation

There is a serious danger that all continuing education and INSET activities become ad hoc in character. The more transient they become the less will attention be paid to the incorporation of activities into the normal system of education. Further, little attention will be paid to monitoring and evaluation. The incorporation of activities is likely to be greatest where progress up the geography teacher's career ladder is directly related to measured success in professional education. Where activities generate credit which can be accumulated to contribute to a validated and valued professional award, which is recognised for salary and promotional purposes by employers, continuing education and INSET have a high profile. The activities are likely to be highly structured and well supported by teachers. Credit systems, incorporating pre-course and in-course credit transfer (Williams, 1987a and the Universities Council for the Education of Teachers, 1987) and credit accumulation are important in this context. We have seen no evidence of studies which have tracked geography teachers through their professional careers which have related progress to the acquisition of particular qualifications. It is an important issue worthy of close attention.

10. Evaluation and monitoring

Blackburn and Moisan (1987), after reviewing the provision of INSET in the member states of the European Community conclude that there are four conditions for the effective development of INSET:

a) in-service training can be effective only if it is linked to a staff development policy;

b) objectives of training must be clearly defined;

c) effective in-service provision must be coherent, flexible and diverse;

d) there must be an increase in the resources allocated to in-service training.

There is nothing exceptional in these conclusions. What is at issue is the ability of providers of continuing education and INSET to measure effectiveness. It is obvious that attempts can be made to achieve this by the employment of teams of expert external evaluators using an array of different strategies. It can also be undertaken by the providers of the activities who monitor and evaluate their own activities formatively and summatively, focussing largely on delivery arrangements. It can also be undertaken by teachers as researchers working in their own classrooms and seeking to find evidence of changes in pupils' learning behaviour which may be related to changes in the teacher's own performance subsequent to participation in an INSET activity.

The literature of evaluation of continuing education and INSET mirrors that of curriculum evaluation. The methodology is largely the same, focussing on a number of dimensions which have been summarised by Stake (1976) as a number of dimensions:

a) Formative - summative
b) Formal - informal
c) Case particular - generalisation
d) Product - process
e) Descriptive - judgmental
f) Preordinate - responsive
g) Wholistic - analytic
h) Internal - external.

These dimensions are likely to be very familiar to specialists in geographical education since they recur in their literature (e.g. the general review by Graves (1982) and the application of Stake's (1967) antecedent-transactions-outcomes model by Slater, (1982). The tasks of applying methodologies associated with these dimensions to continuing education and INSET in geographical education remain to be undertaken. Evaluation is clearly a much more sophisticated concept than monitoring. Monitoring is largely descriptive and focuses on the maintenance of accurate and consistent records which permit comparisons to be made in planning, delivery and achievement over time and between institutions, places and personnel. The absence of such records is noticeable in professional education generally and attempts should be made to rectify this for geographical education.

Conclusion

In this review of continuing education and INSET we have followed a familiar pattern of planning which starts with needs identification and proceeds to the incorporation of plans into education systems. No one doubts that the considerable efforts being made by a variety of agencies - international, national, regional and local - to promote the professional development of geography teachers have been successful in sustaining a lively and progressive approach to teaching geography in many schools in many countries. What we have highlighted is the relative lack of attention paid in the literature of geographical education to descriptive, analytical and evaluative accounts of the practice of continuing education and INSET. Until more national studies have been undertaken and documented in accessible publications cross-cultural studies cannot be initiated. The field is large, including organisational studies of institutions and their effectiveness, teachers' centres and their links with pre-service and in-service education, the effectiveness of teaching and learning strategies, and the experience of using particular modes of evaluation. The agenda is lengthy and worthy of close attention by teams of geographical educators concerned with promoting geography as a significant contribution to the education of teachers and through them to the pupils they teach.

Case studies and applications

Six case studies complete this section. Each one illustrates a form of continuing/in-service education that has been provided for geography teachers in different countries. To some extent it is unfortunate that all the case studies are from developed countries. There is a definite need to include what is being done to assist geography teachers in their professional development in all countries. Here, it is worth referring to the recent IGU Commission Project on developing models in continuing education for geography teachers (Biilmann, Gerber and Williams, 1988) which includes a wider range of national examples.

The first two studies are based in the United States of America. DAVID HILL introduces a strategy for providing geographical education training courses for geography teachers in the Colorado area. The ultimate aim of these courses is to develop a self-sustaining and creative network of skilled geography teachers similar to those operating elsewhere in the U.S.A. under the Geographical Education National Implementation Project. DAVID LANEGRAN puts forward a case for teacher retraining using a case study that focusses on demographic transition. He proposes that this approach should be implemented using a range of carefully-constructed graphics. He concludes that whatever area of geography content is used in retraining courses, it should relate to teachers' interests and needs and should involve the teacher's development of a clear understanding of its key concepts.

SHUICHI NAKAYAMA provides an Asian example when he describes the in-service opportunities that are available for geography teachers in Hiroshima prefecture in Japan. He concludes that very few opportunities exist for participation at a national level, but that definite opportunities exist at the prefecture level where there are specific courses for beginning teachers, teachers of five years experience and teachers of more than twenty years experience. There are, however, a number of questions to be answered about the effectiveness of these experiences. A range of suggestions is included to improve the current situation.

The remaining case studies are derived from European countries HENRIETTE VERDUIN-MULLER and WIM VEEN draw attention to the very demanding challenges which face Dutch geography teachers but which could be applied to other countries. Henriette elaborates the process that has been developed at the University of Utrecht for designing a model for developing effective geographical information resources. There is scope for developing a host of effective geographical products for school geography and for general usage in the broader community. If this approach is expanded, it could lead to the growth of a new career for "knowledge geographers". On the other hand, Wim Veen presents a provocative study of the strategy that was developed in the Netherlands for presenting improved in-service education experiences for geography teachers. The four phases of this process are detailed and then two examples are presented of how this process was used to extend the geographical education of hundreds of Dutch geography teachers.

REFERENCES

Barr, R. and Williams, M. (1983) "Aspects of Pre-Service and In-Service Teacher Education with Reference to Computer Assisted Learning in Geography", in Graves, N.J. (ed.) (1983) *Computer Assisted Learning in Geography*, London, University of London Institute of Education and the Commission on Geographical Education of the International Geographical Union.

Blackburn V. and Moisan, C. (1987) *The In-Service Training of Teachers in the Twelve Member States of the European Community*, Maastricht, Presses Inter-universitaires Europeennes.

Bolam, R. (1982) "Conceptualising In-Service", in Hopkins, D. (ed.) (1986) *In-Service Training and Educational Development: An International Survey*, London, Croom Helm.

Cogan, M. (1953) "Towards a definition of profession", *Harvard Educational Review*, 23, 33-50.

Cogan, M. (1975) "Current Issues in the Education of Teachers", in Ryan, K. (ed.) *Teacher Education, 74th Yearbook of the National Society for the study of Education, Part II*, Chicago, University of Chicago Press.

Eraut, M. (1978) "Some perspectives on consultancy in in-service education", *British Journal of In-Service* Education, 4(2) 95-99.

Fox, P. and Tapsfield, A. (1986) *The Role and Value of New Technology in Geography*, Sheffield, The Geographical Association.

Gerber, R. (1987) "Geography Teaching in Australia in the 1980s", in Haubrich, H. (ed.) (1987) *International Trends in Geographical Education*, Freiburg, Commission on Geographical Education of the International Geographical Union.

Graves, N.J. (1982) "The Evaluation of Geographical Education", in Graves, N.J. (ed.) (1982) *New UNESCO Sourcebook for Geography Teaching*, London, Longman and the UNESCO Press.

Hall, D. (1976) *Geography and the Geography Teacher*, London, George Allen and Unwin.

Haubrich, H. (ed.) (1982) International Focus on Geographical Education. Georg-Eckert Institut fur internationale Schulbuchforschung, Braunschweig.

Helburn, N. (1968) "The Educational Objectives of High School Geography", *Journal of Geography*, 274-281.

Hickman, G.M., Reynolds, J.B. and Tolley, H. (1973) *A New Professionalism for a Changing Geography*, London, Schools Council.

Hopkins, D. (1986) *In-Service Training and Educational Development: An International Survey*, London, Croom Helm.

James, P.E. (1969) "The significance of geography in American education", *Journal of Geography*, 68, 473-483.

Marsden, W. (ed.) (1984) *Teacher Education Models in Geography*, papers prepared in conjunction with the 25th Congress of the International Geographical Union 1984.

Stake, R. (1967) "The Countenance of Education Evaluation", in Taylor, P. and Cowley, D. (eds.), *Readings in Curriculum Evaluation*, Brown.

Stake, R. (1986) "Evaluating educational Programmes, in Hopkins", D. (ed.) *op cit*.

Tolley, H. and Reynolds, J.B. (1977) *Geography 14-18: A Handbook for School-based Curriculum Development*, Macmillan Ed.

Universities Council for the Education of Teachers (1987) *Report of a Working Party on Credit Transfer*, London (mimeo).

White, G.F. (1965) *Geography in Undergraduate Liberal Education*, Association of American Geographers.

Williams, M. (1987a) *In-Course Credit Recognition*, a report for CONTACT (the Consortium of Advanced Continuing Education and Training of the Universities of Manchester and Salford, UMIST and Manchester Polytechnic), Manchester.

Williams, M. (1987b) Geography in GRIST, *Teaching Geography*, 12,(4), 21-23.

Williams, M. (1984) *The Geographical Association and the In-Service Education of Teachers*, A Memorandum submitted to the Advisory Committee on the Supply and Education of Teachers (ACSET), Sheffield, The Geographical Association.

37: HOW TO HELP THE UNTRAINED GEOGRAPHY TEACHER: AN AMERICAN PROJECT EXAMPLE

A. David Hill

Purpose and context

The purpose of this case study is to offer the experience of an American university geographer in conducting continuing geographic education for American secondary public school teachers who have little or no geographic training. Indeed, the term "continuing geographic education" is inappropriate because most of America's teachers have had no geographic education.

Geography has a very small place in the American school curriculum. Inadequately prepared geography teachers are both a cause and a result of this situtation. Moreover, it is rare in American teacher education colleges and schools to find a faculty member with solid training in geography. Those education faculty members responsible for "social studies" teacher education typically have professional education degrees, not subject-matter degrees; their commitment is to the "social studies," which in a nationally-recognized pre-collegiate curriculum are roughly comprised of a sampling of concepts from a variety of social science disciplines, including history and geography. Generally speaking, history is the only discipline that has a degree of autonomy and that is required in the social studies curriculum at the secondary level today.

There are now signs of a renaissance in American geographic education, in spite of the tradition of neglect and the interests of the professional education establishment, e.g., Education professors, school teachers and administrators, state education and certification agencies or regional school accrediting authorities. There is now some slight public support building for geographic education, but without tremendous pressure, it is unlikely that the education establishment will provide the leadership to push hard to add geography to the curriculum.

The leadership of academic geographers is thus necessary to seize the opportunity afforded by this incipient renaissance. Included among the many important tasks for the American professional geographer is the in-service ("continuing") training of school geography teachers. This paper reports on the author's experience in conducting in-service training projects in Colorado, which are funded by the National Science Foundation (NSF) and the National Geographic Society (NGS). This experience shows that teachers with very little or no formal geography training can become leaders who push geography among their school colleagues.

The need for training

The project described in this paper addresses several needs. First, it responds to the need to improve and expand the geographic literacy, including international knowledge, of American citizens. The acknowledged neglect of geographic education in American schools is beginning to give rise to many responses. The training program outlined here is integrated with a number of these responses.

It responds to the initiative of the *Guidelines for Geographic Education: Elementary and Secondary Schools* (1984), which was written by the Joint Committee on Geographic Education of the Association of American Geographers (AAG) and the National Council for Geographic Education (NCGE). This widely-distributed and highly influential publication has created a need to provide locally - and regionally-based training for teachers and curriculum developers in using the Guidelines.

Another need being addresed here is the initiation of local and regional actions tied to national efforts in the improvement of geographic education, a need identified by the Geographic Education National Implementation Project (GENIP), which is an unprecedented joint effort by America's four national geography organizations: AAG, NCGE, NGS, and the American Geographical Society (AGS). Education in America is largely decentralized; educational change takes place at the local level, through local initiative and cooperation.

This project also meets the special need to reinforce a regional incentive to teach more high school geography created by a new geography admissions requirement of the University of Colorado.

Finally, the project responds directly to several specific needs identified by regional teachers who participated in an NSF-funded 1985 summer workshop, which was directed by the author.

The objectives of the training project

The long-term purpose of this project is to attack geographic illiteracy by providing enthusiastic, masterful instruction in modern geography to thousands of secondary school students. To achieve this, the project is creating a Great Plains-Rocky Mountain regional network, linked to the geographic Education National Implementation Project (GENIP), of trained leaders in geographic education. These leaders motivate, support, and learn from each other, thus sustaining the network. In turn, they train others, thus expanding the network.

The general plan for the project

This project is informed by a few key principles:

1. a staff comprised of both professional geographers and professional educators is needed;
2. it builds on the previous project;
3. it trains teams to offer leadership in their school districts;
4. it focusses training on useful educational products; and
5. it creates mechanisms that sustain and expand the teacher development process.

This project began in the Summer of 1986, and it incorporated the participants of the 1985 Summer Workshop. The 1985 project trained individuals from 20 different school districts, but not in teams.

Although the 1985 workshop required that participants develop educational products for academic credit, the current project also requires and supports the piloting and evaluation of products as a principal teacher training mechanism. The project features several sustaining and reinforcing mechanisms not available in the initial project. Participants from all three project years, 1985-88, are connected into a growing network. These and other elements of the general plan are elaborated below.

1. Selection of staff

The author, who directs the project, has directed numerous geographic education projects with national-level funding. His current funding comes from both the National Science Foundation and the National Geographic Society. The staff for the NSF project reported on here consists of both professional geographers and professional educators. Nicholas Helburn, the co-project director, is Professor of Geography, a colleague of the author at the University of Colorado, Boulder. Helburn was the director of the High School Geography Project of the AAG.

The two professional educators on the staff are Marilee Bradbury and A.O. Forbes. Bradbury is the Social Studies Coordinator for the Jefferson County Public Schools, the largest school district in Colorado. Forbes is a master geography teacher in the Boulder Valley (Colorado) School District. He has a B.A. and M.A. in geography from the University of Colorado, where he specialized in geographic education.

2. Building on the initial project

The project integrates the 26 participants of the 1985 Summer Workshop with new participants in several ways. They are kept fully-informed of the current project. The project invited a small group from the 26 to demonstrate at the 1986 Summer Workshop the products they developed the previous year. Not only does this serve to show new participants examples of educational products developed out of the workshop setting, but this experience and contact also reinforces the geographic learning of the previous participants and integrates them into the developing leadership network.

Furthermore, all 26 are invited to participate in academic year project workshops and in-service programs. Master teachers from the initial group are especially urged to play leadership roles in the project.

3. Training district leadership teams

The 1985 Summer Workshop trained individuals rather than teams. With a limit of 30 participants (which from the Summer 1985 experience seems to be an optimum number) this method ideally can reach into 30 school districts. Training three-member teams reaches fewer districts. However, following intensive summer training, individuals often find themselves isolated and have difficulty in communicating what they have learned, in sustaining their enthusiasm, and in implementing their plans. (By integrating the 26 participants of the 1985 workshop, the project helped to ameliorate such difficulties for those individuals.) The reinforcement that individuals get as members of district teams and especially the greater legitimacy they are likely to have as change agents strongly sugggests that the team approach produces the greatest long-term benefits.

Project announcements and application forms are sent to state departments of education, school superintendents, high school principals, curriculum coordinators, and geography teachers, and to schools and colleges of education in Colorado and surrounding states.

School districts are invited to nominate leadership teams to the project. Nominations are considered only from districts that make commitments to utilize the team during the project year in the enhancement of geographic education and geography teacher developement. Approximately 10 teams were chosen to begin the project in the Summer of 1986, and 10 more teams began in the Summer of 1987.

Ideally, each team represents a different district and is comprised of 3 persons:

a) A curriculum specialist: ideally, this person should have a good geography background, and should have administrative responsibilitity, e.g. as a curriculum coordinator or developer, staff development leader, in-service trainer, etc.

b) A master geography teacher: ideally, this person should have a bachelor's or advanced degree in geography, at least three years of precollegiate geography teaching experience, and should have a continuing geography teaching assignment.

c) An inexperienced geography teacher: ideally, this person should have taken some college geography. This person must be scheduled to teach a geography course during the project's academic year.

(Variations from the above ideals of district representation, team size, and the role and qualifications of members are often required, but the integrity of the district leadership team concept should be maintained.)

In nominating their teams, districts are urged to share in bearing some of the project's costs. Cost-sharing is not, however, a team-selection criterion. Districts may pay partial costs of tuition, stipends, subsistence, or travel for one or more members of their team. For example, where tuition reimbursement for teacher development is district policy, cost-sharing is expected.

4. Focussing on educational products

The project emphasizes active learning because "learning by doing" is the most cost-efficient method of obtaining the needed long-term results. Active learning is assured by the requirement that the leadership teams develop, pilot, and evaluate educational products. This is an approach with which the author and his staff have expertise and confidence (e.g. Hill et al., 1974). The focus on products is also maintained when the staff teaches geographic subject matter to the teams. This teaching always involves participants through the hands-on use of exemplary materials.

Beyond the teaching strategy mentioned above, there is another very important reason for focussing on geographical educational products: they are scarce. Examinations of available American texts and supplementary materials for secondary-level geography (one such analysis was conducted by participants in the 1985 Summer Workshop) have consistently attested to the shortage of high quality products. The amount and variety of geographical educational materials in America is inferior to that available in Australia and Britain. (Some of the Australian and British materials are introduced to the American teachers in this project, e.g. Slater, 1982; Fien, Gerber, and Wilson, 1984; Geography 16-19, 1984.)

The long-term neglect of geography in American schools has naturally left a large lacuna of teaching materials; the current rebirth of the subject makes that need even more apparent. Geography teachers need many kinds of materials. The recently published *Guidelines for Geographic Education* (1984) have filled one need but they point to others. Short modules emphasizing student inquiry on significant questions are particularly needed. Another important product needed is high school geography course syllabuses and program designs. Yet another need is for carefully tested, cost-effective, in-service geography teacher-training designs of at least two kinds: those to train geography in-service leaders and those used by in-service leaders to conduct programs in their schools and districts. This project develops the above-mentioned types of educational products.

The district leadership teams design, pilot, and evaluate these educational products with the guidance of the project staff. Common guidelines for all products include the following:

a) *Guidelines for Geographic Education: Elementary and Secondary Schools* (1984) provide basic orientation.

b) A problem, issue, and/or inquiry-focus is used whenever possible.

c) Products are self-contained and ready for teacher use.

d) Products are compatible with existing courses, programs, or other of the team's district structures and are used to improve and expand geographic education in the team's district.

e) A different leader takes responsibility for each product's cycle (design, piloting, and evaluation) and for leading the team's involvement with that product to assure that it truly represents the team's work. For example, the in-service program includes participation of each team member.

f) Project staff consult with the teams throughout.

g) Drafts of products are circulated for constructive criticism prior to piloting and after evaluations.

h) Standard formats are used to facilitate referencing, reproduction, filing, retrieval, and dissemination.

i) Evaluation includes pre- and post-pilot trials.

j) Abstracts of all final products are disseminated to all participants in the project, and complete copies may be ordered from a clearinghouse.

k) The teams disseminate their products within their schools and districts.

l) Selected final products are disseminated through the Colorado Geographic Alliance and the National Geographic Society's network of alliances, the Colorado Council for Social Studies, at the Rocky Mountain Regional Social Studies Conference, the National Council for the Social Studies, and the Geographic Education National Implementation Project (GENIP).

Ideally, each team produces at least one teaching module, a course syllabus, and a plan for in-service geographic education in its district. Within the team, the inexperienced teacher is often the product leader for the teaching module; the master teacher leads the team on the syllabus; and the curriculum specialist is the leader for the in-service plan. Variations from these ideals of course occur in order to meet the specific needs of teams and their districts.

5. Creating mechanisms to sustain teacher development

The project includes a number of activities that support participants in the central tasks of working through the educational product cycles. All district teams initially come together in early June for intensive 2-week workshops devoted to teaching conceptual frameworks, building team leadership capacities, and initiating product developments. Products are written during the following 3 weeks of the Summer 5-week Term. Project staff provides constructive written feedback on products (and assigns grades for academic credit).

Subsequently, teams work in their districts piloting and evaluating their products, including leading in-service programs, during the academic year. The staff conducts a one-day workshop each fall and spring for all participants; these workshops provide reinforcement and follow-up on piloting and evaluation of products and they offer new material on geographic content. Furthermore, project staff make at least one visit during the academic year to each district team. Staff visits assist in coordinating geographic instruction throughout the curriculum, development of materials and programs, teacher in-service, or other needs as determined by the district teams. Finally, the products, having been piloted and evaluated, are disseminated by the project.

Each year's project cycle adds participants to the network. Thirty persons in 10 teams were added in 1986 to the 26 participants from the 1985 Summer Workshop, and in 1987, 30 more persons were added. Thus, the project created, in three years, a regional network of some 90 leaders trained to promote the improvement and expansion of modern geographic education for the eventual benefit of thousands of students.

Under new funding from the National Geographic Society to the Colorado Geographic Alliance, the author conducted a three-week regional teacher-training institute in 1988. These participants are brought into the network through the activities of the Alliance, which is providing financial continuity at the end of NSF funding.

6. Summer workshops

Participants receive two weeks of intensive training at the beginning of the Summer Term; sessions are scheduled all day long for 10 days. (In 1988, in the Colorado Geographic Alliance Institute, an additional week was included for field work and team-building at a mountain site away from the campus.) A needs assessment of participants is conducted to reveal individual concerns and to minimize resistance to the change process. Individual and team goals are developed and recorded. A geography subject matter and teaching pre-test is also administered. Information from these measures is later compared with post-project evaluation measures.

Approximately half of the time is devoted to teaching participants modern geographic subject matter (trends in the discipline, frameworks, concepts, themes, and skills) and its application to high school classroom teaching and to curriculum and program design. *Guidelines for Geographic Education* (1984) is used to orient participants to many of these issues, and a wide variety of materials and techniques is demonstrated. Other sessions focus on team-building and the acquisition of leadership skills in order to train the teams to conduct in-service programs in their districts.

Finally, educational product development constitutes the work of several of the workshop sessions. The basic product development units are the district teams, but cross-district teams of master teachers and curriculum specialists also prove to be productive working units. The staff provides considerable direction and guidance at the outset to assure that these products are properly conceptualized in terms of recent developments both in the discipline and in teaching and learning.

District teams write-up their educational products following the workshop and submit them for evaluation of academic credit in week 5 of the summer term. Project staff provide constructive written feedback on the products to aid the teams in making further preparations for piloting the products. Abstracts of the products are sent to all project participants.

7. Academic year activities

During the academic year the project staff conducts two all-day workshops, one in the fall and one in the spring. These workshops reinforce and build upon what was learned in the summer workshop, namely, geographic content, teaching techniques, and program development as well as leadership training. In addition, team progress reports on, and demonstration, of their products are featured in these workshops.

A second set of academic year project activities are the staff visits to each district. Generally, each district receives one all-day visit by one or two staff members. The essential purpose of these visits is to provide reinforcement, support, and consultation to the district team. But the specific purposes and activities involved vary according to the expressed needs of the teams. Visits (schedules, activities, personnel, materials, and evaluation) are planned well in advance in order to achieve cost-effectiveness.

Teams are involved throughout the academic year in the process of piloting and evaluating their educational products. Following final evaluations, participants distribute their product drafts to the staff for suggestions before they are put into final form for wider dissemination by the Project. All the final products are filed in a clearinghouse in the Center for Geographic Education at the University of Colorado, Boulder and are available for distribution from there. Selected products are more widely disseminated by the Colorado Geographic Alliance, through the Geographic Education National Implementation Project (GENIP), as papers read at professional meetings, and in journal articles.

8. Academic credit

Academic Credit at the graduate level for the project's summer phase is made available through the Geography Department of the University of Colorado, Boulder. Additional credits may be earned during academic year piloting and evaluating of educational products and leadership activities in project workshops and in-service programs. Teachers strongly desire the chance to earn academic credit for their in-service development activities since such credit provides salary and job advancement opportunities. It has, in this project, stimulated some teachers to apply for advanced degrees in geography.

Summary and conclusion

This project will be ultimately judged in terms of its long-term purpose, namely, was it instrumental in creating a self-sustaining and expanding network of trained leaders in geographic education in this region and did it link this network into other similar initiatives across the nation? And are these leaders working effectively in their districts by training others to provide enthusiastic and masterful instruction in modern geography? Has the project forged new and stronger links between the region's schools, districts, and universities? Are some of the educational products developed, piloted, and evaluated by the project being widely used and/or have they stimulated other product development and use? There are a few early indications that allow us to answer a cautious "Yes" to these questions. In the final analysis, are students receiving a much better geographic education because of this project and has this project thus been instrumental in combatting geographic illiteracy in the nation? It is much too soon to be able to venture an answer to these questions.

REFERENCES

Fien, J., Gerber, R. and Wilson, P. eds. (1984) *The Geography Teacher's Guide to the Classroom*, Melbourne, Macmillan.

Geography 16-19 (1984) *Squatter Settlement in the Third World*, London, Longman.

Hill, A.D. et al. (1974) "Learning from in-service teacher education via curriculum development", *Indiana Social Studies Quarterly*, 27(1), 47-58.

Joint Committee on Geographic Education (1984) *Guidelines for Geographic Education: Elementary and Secondary Schools*, National Council for Geographic Education and Association of American Geographers.

Slater, F. (1982) *Learning Through Geography*, London, Heinemann Educational Books.

38: POPULATION CHANGE - A NEGLECTED ASPECT IN AMERICAN GEOGRAPHY CLASSROOMS

David A. Lanegran

Although most geography textbooks used in secondary school classrooms in the United States of America have a unit on world population change through history, the material presented is usually very brief and focuses on simple concepts such as doubling time or the dramatic difference in size between ancient and contemporary populations. Very seldom is any mention made of the variation in population growth rates around the world. Most distressing is the absence of any attempt to deal directly with the concept of the demographic transition. Such a glaring omission is surprising because at the university level, population geography is focussed on the model of the demographic transition and how this process of change varies in significant ways between the westernized population, the developing countries, and other locations where population change is occurring. Therefore, when the Macalester Regional Geography Institute was funded by the National Science Foundation, we determined that one of the major topics for teacher retraining would be population geography. A specific emphasis was placed on the regional variation of population density, factors which affect population growth and the model of the demographic transition.

In the United States, pre-collegiate geography teachers are trained broadly in the social sciences. Very few people teaching geography have actually majored in the subject at the university level. A typical case involves a teacher, who may have had one or, at most, two courses in geography, assigned to teach a course in world regional geography. These teachers tend to be dependent upon the textbook for both content and concepts. Their school administration expects them to cover the book and teach creatively. Because population issues receive such prominence in the popular media, it is important that geography teachers in the schools bring to their students the geographical approach to population growth.

In the United States, concepts from the biological sciences dominate most popular discussions of human population change. Population news is of the crisis genre and is based on the expectation that animal populations will undergo continuous growth until the carrying capacity of the environment is either reached or overwhelmed. In the later event, a population catastrophe occurs and large numbers of individuals die off. This kind of thinking, when transferred to the context in which we all live, is dangerous because it clouds public policy and the thinking of individuals. Because humans have cultures, and are able to change their behaviour to match specific conditions, their population growth is not determined by some kind of biological code. This fundamental difference separates population discussions in human geography from those in ecology. Therefore, in our institute, we emphasize that cultural geography means that cultures vary over the surface of the earth. Because population change is a result of cultural attitudes, an understanding of cultural geography is necessary in all discussions of world population. Simply put, we stress the notion that there is not one uniform world population, but rather several regional populations, each with distinct cultures and attitudes or expectations about the future. Fortunately in the United States, an organization based in Washington, D.C., the Population Reference Bureau, has as one of its major goals the enhancement of education about population issues in the schools. Therefore, all teachers are able to avail themselves of high quality data and graphic materials dealing with population change around the world. In our continuing education institutes, we rely heavily on the Population Reference Bureau's materials. When this material is given a geographic focus, it makes it possible to teach about the demographic transition model.

Our approach to this topic is to try to convey to the teacher a set of fundamental graphics which lie behind all discussion and thought on population. This deep structure provides them with the necessary information to understand population change. We argue that if they can pass this deep structure on to their students, the students will be able to think creatively about population long after their school years are over.

The unit begins with an examination of the basic growth curve which is shown in most high school textbooks. This growth curve shows the relatively slow growth of the world's population for most of human history and the rapid increase in the modern era. Three fundamental points are made in discussions of this growth curve. First, the huge number of people on the earth now compared to the past means that humans have only recently begun their dominance of the surface of the earth. Secondly, we point out how the world's population growth could be influenced dramatically by changes in a regional population. The easiest example for classroom use is the impact of the bubonic plague on Europe during the 14th century. We feel it is very significant to spend a great deal of time on the plague for three reasons. First, the plague is the best example of how a disaster in one locale can be severe enough to slow the world's population growth rate dramatically. This allows us to emphasize the point of viewing the world's population as a set of regional clusters. Secondly, the plague is a phenomena of which most people have some awareness. To be sure, American students know very little about the plague, but most have at least heard of it. The dramatic, gory descriptions of contemporary writers of the plague make for a very memorable lesson for secondary students and gets them keenly interested in the rest of the material presented on population change. The final reason to study the plague is as an extreme case of an epidemic. All students are aware of influenza epidemics. That awareness gives them a link back to times when life was much more precarious. The third aspect of the generalized growth curve which must be highlighted for teachers is the fact that the large population increase in the modern period occurred in two phases. The first phase, roughly from 1650 to 1950, is the growth of the Westernized population. The current growth phase is the result of the growth in the developing populations. Therefore, at the end of this discussion the students should all be aware of the fact that the world population cannot be considered as a uniform whole. If they are to understand the dynamics of growth, students must study the geography of the population and be aware of the fact that changes in a region can be so dramatic that they will cause either a decrease or a dramatic growth in the world's total population.

The second fundamental graphic is, of course, the demographic transition as experienced in Europe. Unfortunately, demography is not a university subject in the United States and, for reasons unknown to me, the demographic transition does not feature largely in courses on the history of Europe or regional geography courses taught at the university level. Therefore, many teachers have never seen a graph of this process. When examining the demographic transition, the fact that crude birth and crude death rates change is obvious to anyone who can read a graph. We make sure that the teachers in our institutes understand the tie between age-sex pyramids and the demographic transition. We illustrate phases in the transition with appropriate pyramids to increase the impact of the graphic approaches to the content.

This is not the place to describe in detail the demographic transition. Suffice it to say that our chief point of departure when discussing the demographic transition is that the human population grows or declines as a result of the interplay between birth and death rates. While death rates are the result of general societal changes, improvements of diets, absence of war, and availability of medicines, it is necessary to point out that the birth rate is the result of the summing of a host of individual decisions made by couples engaged in their life process. The decision to have or not to have children is made according to the potential parents' evaluation of a three-part formula. Essentially they weigh the cost of having children against the benefits which the children bring to them. Those benefits are the economic gain which a child labor provider brings to a family and also the social and emotional pleasures which children bring. We emphasize this because we feel it necessary to point out to the teachers that individual couples all around the world go through essentially the same decision-making process when having children. Parents of children born in Bangladesh have determined a value for children which they then measure against the children's cost. Couples in suburban San Diego use an equally rational decision-making process when they decide the size of their family. Perhaps we over-emphasize the factors behind child-rearing, but in the United States, as mentioned above, it is necessary for the social scientist to balance the strict biological growth models which dominate policy makers' views of the Third World. Part of our ethnocentrism allows American students to think that they were born to couples who consciously decided to have children, while in the Third World, somehow parents just go about having children in response to animal drives.

The in-service teacher's attention must be focussed on the sorts of things which would cause individual families to limit the number of children and on factors which would bring about a decline in the birth rate. Many teachers assume that a decline in the birth rate is the result of a technological innovation. Therefore, it is necessary to point out that a change in birth rate has to be tied to some change in the cost/benefit ratio of children which occurs when a society becomes more wealthy. This is perhaps the hardest thing for a student at any level to grasp. As cultures become wealthier, couples decide to limit the size of their families. What is this value change which occurs as a culture prospers? Most students of the demographic transition argue that it is a shift from short-term to long-term thinking. According to this interpretation, couples realize that, by investing more money in their children, the family will advance socially and economically as the generations march forward.

The third fundamental point is a graph contrasting the change in birth and death rates in developing countries during the 20th century. These are the populations which are increasing most rapidly. In addition, they are growing on a large population base. The key points are that the birth rates in these countries exceeded pre-transition rates in Europe, and the death rates fell much more quickly because of the importation of Western death technology. These graphs force the reader to consider two questions. What will cause the birth rate to fall in the Third World countries at a rate equal to the decline in death rate, and how fast will that change occur?

It is quite easy to see how the growth rate in the Third World has overtaken the growth rate in the Western societies. Thus, we are faced with the very geographic question, "Does the demographic transition work as a model for future change in various places within the Third World?" This is a lively public policy question in the United States. The official position of the Reagan administration is that the demographic transition model explains population change, and therefore, the Federal government shall not engage in activities which are designed to limit the birth rate. Rather, the administration argues that if the developing economies engage in more free enterprise and refrain from central planning of their economies, not only will their economy prosper, but the population growth rate will decline as a consequence of greater prosperity. This obviates the need for family planning programs or the introduction of birth control technology from the West.

The final graphic to be used in the discussion of the demographic transition is the age-sex pyramid for West Germany. Here we see a population with the crude birth rate lower than the crude death rate. This is an important concept to present to North Americans because of the similarities between the German and North American cultures. Both societies are heavily industrialized, have passed through the demographic transition, and are importing labor to do the tasks needed in the society. Neither starvation nor high population densities caused the Germans to limit their family size. This graphic seems to mesmerize our students, especially those of us in the middle of the continent with large amounts of space around us. The graph allows the teacher to spur the students' speculations on the sorts of things which would cause a German couple not to have children. This then brings up the obvious question of what sort of things go through the mind of a couple in Tunisia as they decide not to limit the size of their family. It allows the teacher to use fundamental concepts of geography to help explain human behaviour. Clearly one cannot understand the population growth of Germany unless one knows that place. Likewise, one cannot understand the population growth of North Africa unless one knows the geography of North Africa, and so on around the world.

We find that this approach to population and geography greatly enhances the social science teachers' interest in regional geography. Geography shows without a shadow of a doubt the significance of regional variations of culture around the surface of the earth. Instead of just memorizing differences and place names, the students have a conceptual framework in which to organize and categorize the information which they are receiving.

When teaching population geography, we try to take the subject a step further and use it as a way to build critical thinking skills. This can be done with a computerized data base, which we provide for our teachers in Minnesota, or it can be done by simple pencil-and-paper correlation activities, developed by Patrice St. Peter, a high school teacher in Mounds View.

It is necessary to determine what sort of in-service training is most valuable to social science teachers. Although we frequently preach the importance of geography, it is not always substantiated to the complete satisfaction of the social studies teachers trained in other disciplines. It is our experience that, when the demographic transition is the keypoint of an in-service institute, it is easy to show how the five concepts of geography help explain the future of the world's population. Because every social science teacher in the United States is interested in the future of the world's population, in this context they can be easily convinced of the value of geographical concepts. They are then much more inclined to incorporate geographical concepts into their teaching.

39: THE CURRENT STATE OF IN-SERVICE TRAINING OF GEOGRAPHY TEACHERS - IN HIROSHIMA PREFECTURE, JAPAN

Shuichi Nakayama

The purpose of this paper is to present a clear understanding of the system, the problems and the prospects of in-service training for geography teachers, focusing on the case of Hiroshima Prefecture.

With rapid globalization of the Japanese economy in recent years, in-service training of teachers in Japan is rapidly gaining more attention among educators as well as educational administrators. Educators in the field of geography are certainly no exception to this trend. However, it seems that the in-service training of geography teachers in Japan has much room for improvement.

The major problems to be solved at the earliest stage are:

1. the insufficient amount of time for training,
2. limited access to the training courses, and
3. lack of maturing in the programs' curriculum.

A wide variety of programs, but insufficient time to complete them

Figure 39.1 shows the wide variety of programs for in-service training of teachers in Japan. The systematic in-service training of teachers, principals and supervisors is being conducted through four basic channels:

1. national level which is managed directly by the Ministry of Education, Science and Culture,
2. prefectural boards of education,
3. universities and research institutions, and
4. voluntary organizations.

Among these four channels, the in-service training by the prefectural board of education plays a very important role and runs a number of programs during the year. The predominant aim of in-service teacher training in Japan is to improve teachers' professional abilities. Therefore, attendance and the participation in in-service training programs is not normally rewarded with salary increase.

1. National level programs

The Ministry of Education, Science and Culture conducts two major programs of in-service training of teachers at the national level. Participation, however, is severely limited.

The first one is the Central Workshop for the Improvement of Curriculum. These are held at two cities, one in western Japan and the other in eastern Japan. The workshop is organized for all subjects and is held for only two days in a year. Every year, only one geography teacher from Hiroshima Prefecture will have an opportunity to attend. The second one is the National Meeting for Curriculum Study which is a two day program held annually in Tokyo.

At this meeting, the section on geographic education will be held every two years. For this meeting only one geography teacher from Hiroshima Prefecture will have the chance to attend.

Other than these two regular programs, the Ministry of Education, Science and Culture as well as the Prefectural Board of Education sponsor teachers' Study Tour Abroad programs every year. According to the data in "Education in Japan" (Ministry of Education, Science and Culture, 1983), about five thousand principals, vice-principals and teachers a year from various school subjects participate in this program. However, only one or two geography teachers from a prefecture will have the opportunity to participate in this program.

The Ministry of Education, Science and Culture also holds a special workshop for selected teachers in which geography teachers from Hiroshima Prefecture have the chance to be included. The Ministry of Education annually holds Central Workshops for intensive in-service training of principals, vice-principals and experienced teachers (e.g. curriculum coordinators, head of teachers' groups teaching the same grade or the same subjects in a school), who are selected and sent by all prefectural boards of education. The Tsukuba Annex of the National Education Center with its excellent facilities is well equipped for the Workshops, which are usually composed of high quality lectures and seminars related to school administration, curriculum theory, instructional methods, etc. (Ministry of Education, Science and Culture, 1983).

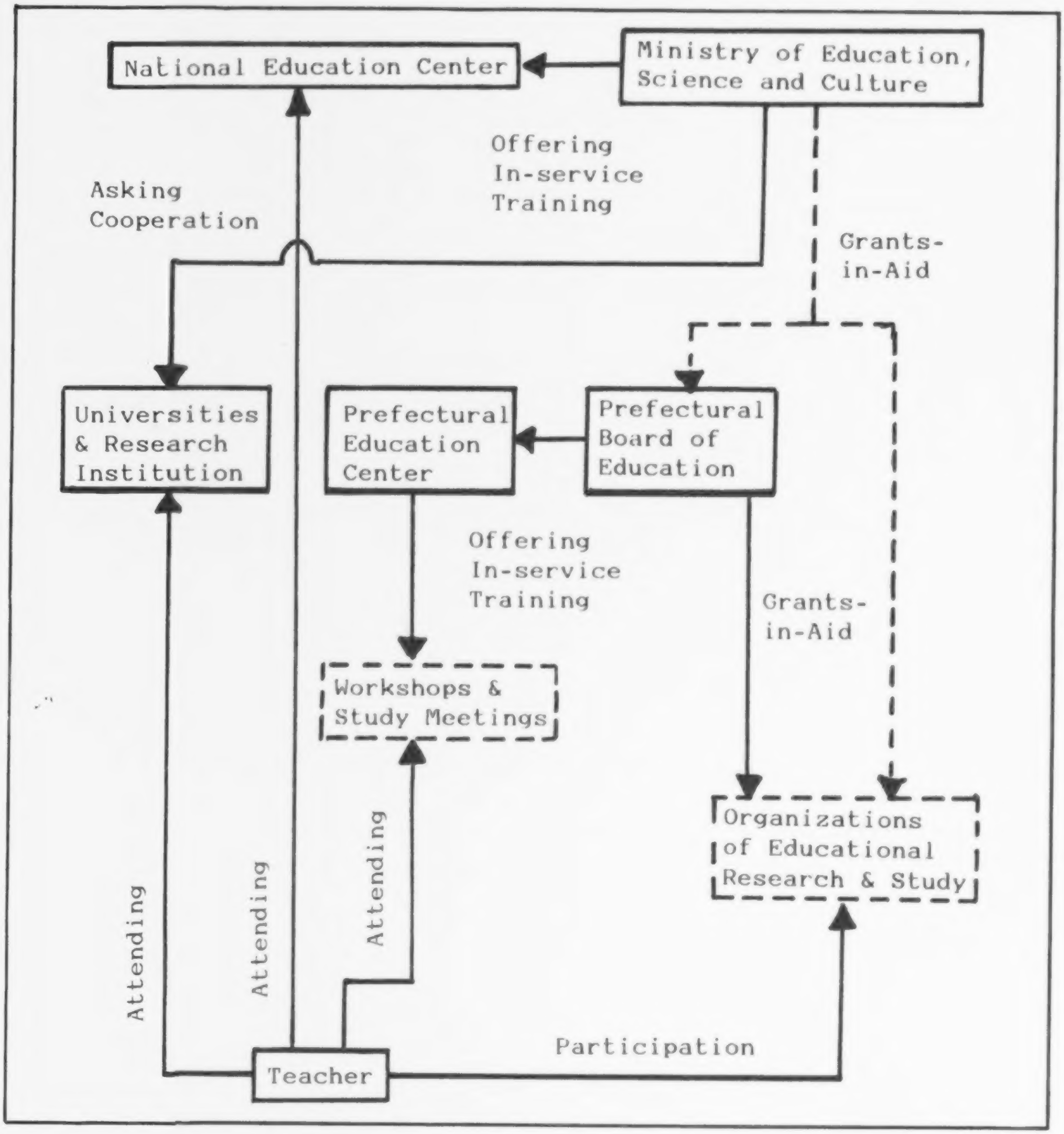

National Education Center
Ministry of Education, Science and Culture
Offering In-service Training
Asking Cooperation
Grants-in-Aid
Universities & Research Institution
Prefectural Education Center
Prefectural Board of Education
Offering In-service Training
Grants-in-Aid
Workshops & Study Meetings
Organizations of Educational Research & Study
Attending
Attending
Attending
Participation
Teacher

Figure 39.1 The Inservice Education provision of Japan

2. Prefectural level programs

The prefectural level programs for in-service training of teachers are basically managed by the prefectural board of education. This institution directly organizes the prefectural level meeting for curriculum study, which is held for two days during the summer vacation in August. These meetings attract a large number of geography teachers within a prefecture.

Other programs are conducted by the prefectural education centre which is the main institution offering in-service training of teachers.

Taking the social studies field in Hiroshima Prefecture into consideration, there are three categories for each of the three courses; basic, research, and instructive courses.

The section on social studies is categorized into three; the primary teachers' group, the junior high teachers' group, and the senior high teachers' group. Each course takes two days and caters for fifteen teachers. However, there are serious problems as seen in the case of Hiroshima Prefecture. Here, there is only one post for a social studies consultant. If the consultant is a well experienced geography teacher, how is that teacher to conduct a history education workshop of the same quality? There is a tendency for most of the prefectural education centres to have only one social studies consultant who is a very experienced teacher in only one social studies subject: geography, history, economics, etc.

For secondary level teachers, there is the High School Social Studies Teachers' Association which is a voluntary study organization, funded by the prefectural board of education, and by the PTA's of each member school. This Association usually conducts study meetings, excursions and lecture meetings for each section, for example, geography section, history section, etc.

3. Compulsory in-service training of teachers

The prefectural board of education carriers out the compulsory in-service training of teachers at three levels:

1. for newly recruited teachers during their first year,
2. for younger teachers with five year's teaching experience, and
3. for experienced teachers with 20 year's teaching experience.

These programs have been carried out since 1977 for primary and the junior high school teachers, and since 1978 for senior high school teachers. The workshops for these programs are conducted at the prefectural education center. Newly recruited teachers have to attend 20 days in-service training programs including 5 days of intensive courses in their first year of teaching. A two-day program is offered for the other two levels. However, much of the time is concentrated on lectures related to school administration, curriculum theory, instructional method, etc. The lack of attention to subject matter is a serious problem.

Difficulties of promoting in-service training of teachers

It should be noted that both the amount of time offered and the limited number of participants in the in-service training of teachers in Japan is not in line with teachers' demands. Some reasons can be found for these problems. Firstly, the budget limitations affect the problems in two ways:

1. It is difficult for teachers to take a sufficiently long period of leave from school because schools cannot provide back-up teachers to cover their absence from school.
2. With limited school budgets and travel funds, teachers cannot be sent to workshops and seminars which are held at some distance.

Toward the improvement of in-service training of teachers

It may safely be said that there are several problems with the present Japanese system of in-service training of teachers. Most geography teachers will be eligible for 5 days of in-service training during the first year of their careers, two days after five years of experience, and two days after 20 years of experience; a maximum total of only nine days during their teaching lives under the very organized system. If there is the chance to attend or participate in a special workshop or seminar, they will be able to enjoy another two to four days of in-service training, but that is all. Furthermore, it is certain that during these periods they will receive little effective training to strengthen their teaching ability.

The following points are some suggestions for improving the in-service training system in Japan, with special reference to geography teachers:

1. Geography departments at universities and geographic associations must be more involved in the in-service training of teachers.
2. Prefectural as well as Central Governments must increase their budget for in-service training of teachers to expand the number of training courses.
3. A change in mood at the prefectural education centres is necessary. Because the lecture style is dominant in most courses, there is little chance for discussion. More direct discussion with acadamic geographers and geographic excursions are more effective than boring lectures by specialists.
4. There needs to be a reconsideration of the content of material presented in workshops and seminars. More emphasis should be placed on development education which is currently not well developed in Japan.

REFERENCES

Hiroshima Prefectural Education Center (ed.) (1987) *Schedule of In-service Training of Teachers for 1987-88.*

Ministry of Education, Science and Culture (ed.) (1983) *Education in Japan*, Tokyo, Gyosei Pub.

40: INFORMING THE INFORMATION SOCIETY - HARD AND PAINSTAKING WORK AHEAD

Henriette Verduin-Muller

The purpose of this paper is to encourage more people to think about physical, social and cultural geographical phenomena. This means that we, as educational geographers, have to make greater use of high quality and user friendly geographical material.

Information and knowledge (in the sense of what is to be learned) only become useful when they are manipulated by people. Fortunately, the concept "information" is getting back its original significance, namely "Knowledge acquired through experience or study (Collins English Dictionary, 1987), after being confused for about twently years by computer scientists who redefined it as merely "data". Thus it is only legitimate to use these terms when they are used in their correct context. Any information has the potentiality for being generated into knowledge . However, much will not be acquired at all, while other information is just stored in our memory waiting for the appropriate moment to be generated into knowledge. The clearer the original information is, the easier it will be for people to accept and store it, and ultimately the easier it will be for information to be translated into knowledge. Thus the clearer the input, the better people's thinking is served.

The need for information and knowledge and how they are used

Informing is a broad concept. It may vary from education in the usual sense of the term to getting information from the public domain. Informing is also a world-wide concept. All over the world, in the northern and southern hemisphere, people try to broaden and to deepen their knowledge.World wide education for life seems to be a current priority. This is correct because only knowledge can give people the security to live, to participate in the 'res publica' of a democracy and thus to feel safe in the personal and well as in the social sphere.

The institutions responsible for learning and informing are many and varied. They range from the classical school to all kinds of non-classical forms, such as telecommunications. These learning and informing services, whatever their form will increase in number in the coming years. As people realize the importance of knowledge both for themselves and their children, they will participate in educational informational activities more than ever before in history. The participation may be full time, part time or merely incidentally. The main point is that the increase will be worldwide.

Although the needs for adult learning and public information will be extensive and varied, the content of its message and its expression will always be crucial to the spread of information. Poorly conceptualized content may lead to wrong ideas kand thoughts and thus to poor or inappropriate decisions. Thus it will become increasingly important that messages are thought out and designed will the greatest of care. Unfortunately, as we all know, this is currently not always the case.

In this paper it is proposed that the need and use of geographical information for adult education and in the public domain is of special importance. Recently, people seem to have become aware of space in general and of their own local and regional surroundings (their environment) in particular. Consequently, special geographical knowledge is needed. Telecommunications are making the world a smaller place. News and events are spreading quickly. Through this 'nearness', people become more interested in their world and they form opinions. In order that these opinions are well founded, accurate geographical information is essential.

Types of message

Messages, as used in the wide range of adult education to the public domain are, in a formal sense, of three types:

1. specially designed messages
2. existing messages
3. adapted messages

Specially designed messages consist of content , conceptualized and made to fulfil highly specific learning and information needs.

Existing messages are the ones already 'on the shelf'. In contrast to the former category they may be conveyed ready made. Usually, the contents are of a more general character and designed for a relatively broad target group. All specially designed messages have to be included in this group once they have fulfilled the special function for twhich they were designed. Unfortunately, they are often so specific that the chance of them being used again for a similar purpose is practically zero.

Adapted messages comprise the largest group of messages.

Existing messages may undergo adaptation to make them useful for a new purpose. The adapotation may vary from slight changes to the text or visuals to major rewriting or redrafting. Because the process of creating original messages is very expensive in time and energy, such adaptation is very common. Meeting the demands of the information society requires very special and high quality materials. Moreover, only by understanding the process of creating specially designed materials can we take existing messages and transform them into adapted messages. In adapting messages to meet new requirements, existing materials must be analyzed very carefully and on the basis of the findings the materials may then undergo the necessary reconstruction. However, the analysis as well as the reconstruction can only take place if we know how the content came into existence. Both procedures: analysis and reconstruction are two sudes of the same coin. This leads to the thesis that a thorough knowledge of the specially designed message process is fundamental. Unfortunately, this process and its importance is often neglected or more properly not 'seen' by the disciplines, geography included. This is a failure which must be addressed by geographers who have developed not only their knowedge, but also their communications skills.

A model for designing and presenting geographical information

This model was developed between 1974 and 1984 at the Geography Institute, State University, Utrecht. Full details of the development phase are presented in Verduin-Muller (1984). The model is represented graphically in Figure 40.1.

The process as represented in Figure 40.1 has two parts.

1. A description of the information: programme requirements, scientific sources and conceptual structure. This may be regarded as the creation phase.
2. A description of the design and presentation of the information. This may be regarded as the production phase.

These two phases are bridged by the requirements of the information to be presented. Sometimes decisions in this area are taken by the message creators, and sometimes by those involved in the production of the message. Whether such decisions should be made by creators or producers should depend on the expertise of participants, but often it appears that the prestige of the participating institutions carries more weight. For this reason, it is fortunate that increasedgeographical knowledge by designers has been matched by an increased awareness amongst creators of the importance of high quality production. The result has been some closing of the gap between creators and designers who work in different institutions and the benefits of their mutual understanding may be seen in the "Global Geography Project" of the Agency for Instructional Technology, Bloomington, Indiana; the exhibition about the State of Minneapolis in the Science Museum, Minneapolis-St Pauls and the Doomesday Project from BBC Enterprises, London.

Specific attention will now be given to the individual elements of the model, although readers are asked to remember that the elements only have value within the context of the model as a whole.

1. The programme requirements

The programme requirements have two functions:

a) to guide the planning process, and
b) to present an overview of the final product.

A detailed programme of requirements ensures that the whole process is made accessible for evaluation and development by co-workers and outsiders. Although the drafting and wording of such a programme of requirements takes much trouble and time, it is an excellent investment. It does not mean that the many difficulties on the way to the final product will all be removed but at least the way should become clearer.

The idea of formulating a programme of requirements is taken from the world of industrial design. Initially, the first element of our work was curriculum-oriented and contained only objectives and remarks about the expected target group in general terms. Our research proved, however, that this was far too meagre and its replacement by the programme of requirements may be regarded as fundamental to the development of the model.

2. The source study

After the geographic content as given in the programme of requirements has been clarified in general terms, the source study can take place. This study is essential since full knowledge of the subject area is necessary if mistakes and missed opportunities for aiding conceptualizations are to be avoided. Reference to two types of source material is made:

a) primary sources such as the results of empirical research;
b) secondary sources such as research reports, literature, statistics, maps and iconographic materials.

Usually a combination of these types of source material are used and careful notes and references are indispensible. The source study is kept within bounds by the carefully prepared programme of requirements which was described above.

3. The conceptual structure

The conceptual structure can be described as the way in which the various aspects of the topic fit together. A diagram is necessary to obtain a clear overview of the topic. In this diagram, not only are the different concepts given a specific place in the structure but also the

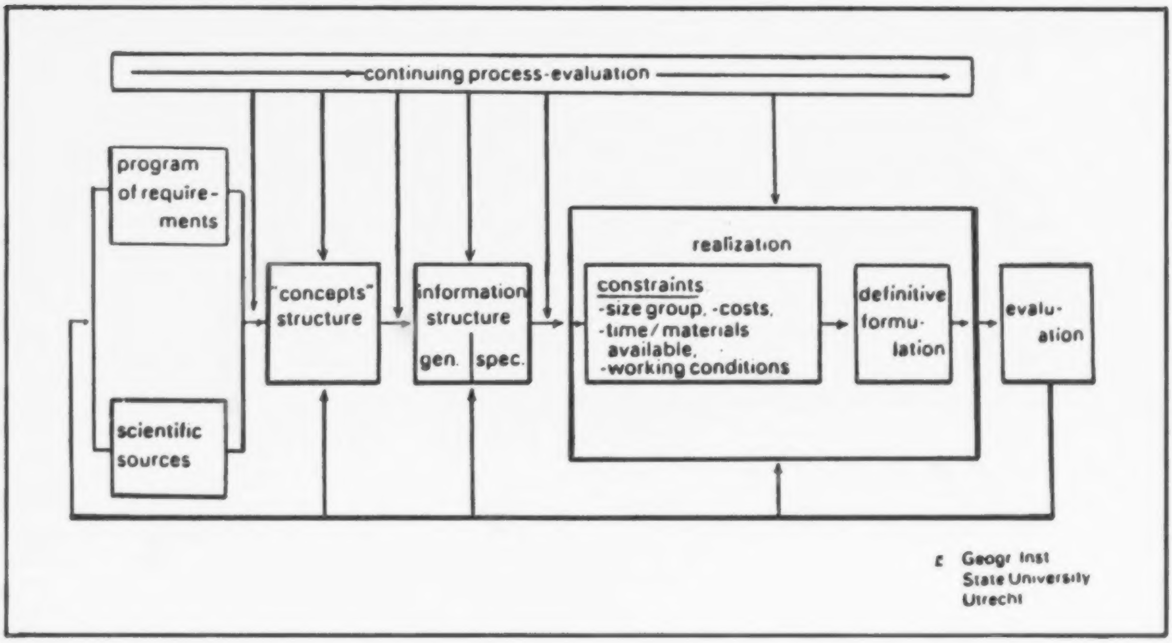


Figure 40.1 A model for designing and presenting geographical information

relations between the concepts are laid open to discussion and may be clarified. Thus the diagram of the conceptual structure represents the interdependence of all the elements of the topic.

The conceptual structure may illustrate alternative ways of approaching the objectives which were laid down in the programme of requirements. The alternative approaches may suggest a scientific orientation and a people/society orientation.

With a scientific orientation, the geographical information is published for its own sake. It is a translation of the research output of geography as a discipline of study. Such scientific enlightenment has become a popular means of communication all over the world, making scientific magazines and television programmes a flourishing business.

The people/environment orientation is quite different and much more difficult to achieve. In this case, the primary and secondary findings are used as a source for clarifying and explaining certain themes, problems and processes and to encourage reflection on future developments. As such it represents an application of the discipline.

Although the outcome from the conceptual structure is rather limited in size, the work itself may take a great deal of time and energy and frequently a complementary source study is needed. This is especially true for people/society oriented concepts. Our research has shown that the main reason for the extreme difficulty experienced in presenting people/society oriented information results from the wide range of interpretations which may be placed on the evidence.

4. The information structure

The information structure is, as suggested earlier, a transitional phase between the two original parts of the model and thus contains some peculiarities of its own. Empirical research has shown that creating the information structure, especially in relation to the conceptual structure, is a complicated affair. Two steps in creating the information structure have been distinguished.

In the first step, the various aspects of the content are outlined in general terms and described verbally. After careful consideration of the aspects of the content and its ordering, a general outline is created.

The general outline is then further refined and is then presented as a combination of words and images. This combination is essential since words and images are complementary sources of knowledge. Although the expertise of educationists, communicators and media-people is essential, the final responsibility for the exact combination of words plus images rests with the "knowledge" source - the geographer.

5. The final presentation

This element includes the final translation of the words-plus-images formula which has been created into the medium or media which were originally envisaged in the programme of requirements. The principle of translation is the same for both print and non-print media, although the levels of craftsmanship needed for each are very different. One of the main differences is that print forms tend to be more verbal and the non-print forms focus more on visual representation. For such reasons, the expertise of appropriate editors or programmers is needed at this stage, although the introduction of this expertise often results in differences of opinion on how the final product should be presented.

It is important to realise that as a result of the programme of requirements, the type of medium to be used is known by all concerned from the very beginning. It has been found to be valuable to start the process with a certain vision of the final product while maintaining an open mind on detail throughout the planning and design stages.

6. The evaluation

Finally, the product must be evaluated both formatively and summatively. In this context, the formative evaluation is considered to be part of the model while summative evaluation becomes part of another, totally different research project.

As a result of the formative evaluation findings, it may be necessary to make some changes to the final product. However, these changes should only be made after considerable discussion amongst all those in the development team.

7. Concluding stages

After all the work has been completed, we would advise that a complete description of the whole process be compiled. This would include such information as the agendas for all meetings, minutes to record the development of the discussions and the reactions of the participants and copies of all process documents. Such descriptions are of great help when planning new products. Moreover, they will form excellent study material for future developers and designers of geographical materials. Such full and empirically based descriptions could also contribute to the search for theory and method in the systematic design of geographical information which is one of the most neglected field of our discipline.

The adaptation of existing materials

As was stated earlier, adapted messages probably comprise the largest group of informative materials. Developing specially-designed materials is made very expensive by the large amounts of time and energy involved. One solution to the problem of cost may be to adapt existing material. The present writer adopted this solution when seeking to produce a documentary film in 1964. The way in which geographical knowledge quickly becomes dated provides a second justification for adapting existing materials. However, if such adaptation is to be taken seriously, it must be conducted along systematic and well-considered lines. Once again, our model will render excellent service in guiding the planning process in two ways. Firstly, it allows educators to examine the disciplinary and informational value of the product, and secondly, it allows them to plan and design appropriate changes to content and form. Once again, of course, a full description of the process of adaptation will help further work on the product in question and new-comers to the task.

A profile of the new professional: the Knowledge Geographer

We propose that the new professional in this endeavour to improve the transmission of knowledge be called "The Knowledge Geographer" and that he or she be given the subsidiary title of "Developer and Designer of geographical information". Such a profession is gradually taking shape in our society, but it is from already existing research data that the basic qualities of the knowledge geographer can be determined. These include:

1. A democratic and emancipatory nature: the willingness to share information and not to be afraid to share power. This openness to sincere co-operation involves admitting one's own dedication to the work rather than any attempt to organize the time of other people.
2. Knowledge of the state of the art concerning theory and methods of developing and designing geographical information, together with training in its applications. This involves a thorough knowledge of the theory of the discipline of geography and its content as well as familiarity with pedagogic skills.
3. Mastery of conceptual thinking, especially in relation to geography topics.
4. Possession of a good command of words and images and an enjoyment of creative approaches to work.

It is no longer sufficient to think of developing, designing and producing geographical materials for education and the public domain as just an activity for a rainy weekend. Nor is it a task which can be left solely to a research geographer or a geography teacher. These people have other more effective ways of using their skills. This is not to suggest that their specific expertise is particular areas may not be essential. However, the necessary study and the systematic development of the total process demand full time and professional specialisation which belong to, and are part of, the modern knowledge service-industry.

To an outsider, the qualities listed above may appear to be trivial. However, it is very difficult to express the "cementation" or mental strength which binds the qualities together, in words. In reality, the four qualtities should be regarded as forming a single pre-condition for admission to the new profession. We strongly advise geography faculties and research institutions to promote research in the preparation of geographical information for education and the public domain and to consider teaching the development and design of such materials to their students.

REFERENCES

Collins (1987) *The Collins English Dictionary*, London, Collins.

Verduin-Muller, H.S. (1964) Het Hong Kong-Experiment, een onderzoek naar de didactische waarde van een 'aangepaste' documentaire film in Verduin-Muller, H.S. *Laren met beelden*, Groningen, Wolters, 138 - 262.

Verduin-Muller, H.S. (ed) (1984) *Geography for Education Paper-Book, 1974 - 1984. The process of growth of an Innovation*, Utrecht, State University of Utrecht.

41: EXPERIMENTS WITH A NEW DESIGN FOR IN-SERVICE EDUCATION

Wim Veen

In-service training ("INSET") for geography teachers appears to be a difficult job to do. Satisfaction among the clients i.e. the teachers is often disappointing for those who tried so hard to arrange useful experiences. Moreover, the effects of INSET on teaching practice seem to be very limited.

The in-service training discussed in this paper is confined to the field of subject-oriented INSET which aims to develop teachers' working knowledge of geography as a school-subject. It is a plea for "client-centred" in-service training.

Client-centred INSET concentrates on the practical usefulness of teaching strategies for the working-situation of the client i.e. the teacher's classroom. It therefore has two major principles:

1. to develop pupil-ready teaching materials for classroom use, and
2. to engage only those intermediaries who are familiar with the working-situation of the teacher.

Experience with client-centred INSET has been gained from two national INSET experiments for geography teachers in secondary education in the Netherlands. These two experiments are described below.

Introduction

1. Problems of INSET for geography teachers

Teachers can be considered as professionals acting in four important domains (Hermans, 1981):

a) They are geographers by discipline i.e. they have to be experts in their field.

b) they have to translate this expertise to the pupils' level of acting and thinking.

c) in working with youngsters they are guardians of adult norms and values.

d) in working with groups they have to be well versed in group dynamics.

Subject-oriented INSET emphasizes the development of professionalism in geography teachers in the first two of these fields.

The justification for subject-oriented INSET is to be found in the continual changes made in the Dutch geography curriculum. The O-level and A-level final examinations in particular cause several items to be changed every fourth year. Due to these regular curricular changes geography teachers are eager to attend INSET courses.

However, Dutch geography teachers' satisfaction with existing subject-oriented in-service training had been relatively low for a long time. Negative comments on its usefulness for daily classroom-management were frequent.

What were the characteristics of most geography INSETs in the past?

a) In general, in-service training courses consisted of evening sessions of three hours. Most teachers do not want to attend courses lasting longer than that.

b) Each session was divided into two parts:

   i) a lecture by a geography expert in the matter concerned and
   ii) a didactically oriented session usually given by a teacher trainer.

   The latter tried to "translate" academic geographical knowledge into classroom relevance.

INSET courses have been based on this concept for years. The courses have been evaluated by asking the geography teachers to fill in a standard questionnaire. The results have revealed a number of shortcomings:

a) The lectures by geography experts were often excellent from an academic point of view, but were frequently of little practical use to teachers in their daily routine.

b) Each lecture was given by a different geography expert. Most of them did not have any time for planning or discussion with either the other geography experts or the teacher trainer in charge of the second part of the sessions. As a consequence, there was no link between the lecturers themselves nor between the lectures and the didactical parts of the sessions.

c) Syllabuses distributed to the geography teachers consisted mainly of copies of academic articles or chapters of books. For the geography teacher as a geographer they might have been of great interest. For the geography teacher as a teacher the syllabus did not provide materials to be used in the classroom. In short: geography teachers asked for -

   i) selected information adapted to their daily task;
   ii) more internal structure in the information given;
   iii) materials that could be used in the classroom.

2. A new concept for INSET

Until 1987, the in-service training programmes for geography teachers in higher secondary education were coordinated by a national board (Geoplan) on which, Dutch universities were strongly represented. In 1984, the planning commission of this board decided to try to improve the in-service training programmes and installed an INSET-team to develop a programme to deal with the changes in the next final examination items. The first new item to be introduced in the geography curriculum was the Federal Republic of Germany (FRG).

The INSET-team formulated four basic principles:

a) The geographical contents of in-service training should be selected in the light of what was to be taught in the classroom. The teachers should get a syllabus that helps to prepare their lessons. Information important only from a scientific point of view was to be excluded.

b) Teachers attending the INSET courses should get pupil-ready teaching materials closely bound up with the INSET courses. In this way the contents of the INSET sessions would be translated into classroom materials. During the INSET session teachers could thus concentrate on the acquisition of new and relevant knowledge.

c) The distinction between geography experts and teacher trainers working apart should be abolished. Instead the INSET programme should be developed by a team of "intermediaries" well acquainted with classroom life. Each member of the team should be responsible for the execution of the INSET programme at a certain place. The INSET-team as a whole should be responsible for the development of the Syllabus as well as the development of ready-to-use classroom materials.

d) The classroom materials should provide the teacher with a wide range of media in order to stimulate teachers to use a variety of classroom activities. This idea contains an innovative goal of teaching skills.

Looking at these principles one can notice some interesting similarities with what has been proposed by other writers on in-service training. Huberman (1985) states that teachers attending INSET courses expect to get:

a) Instrumental knowledge that they can integrate very quickly into their classroom routines.

b) Knowledge drawn from accessible sources that they can use in their working-situation.

Thus, teachers are looking for direct benefits for their lessons.

Another similarity with recent research on in-service education concerns the question:

To what extent should the INSET course-teacher be acquainted with daily school life?

It is generally accepted that an INSET-teacher who does not know classroom practice at first hand will have less authority than one who has been a teacher himself and who is aware of the difficulties of implementing didactical ideas and new content in the classroom. The third principle of the INSET-team reflects this view. It is much easier for a teacher to identify him/herself with a teacher trainer than with an expert working at a highly specialized institute which has no links with education. Furthermore, "intermediaries" as teacher trainers also differ from experts in lecturing and choosing materials.

INSET frequently aims at innovations of pedagogical strategies and skills. Subject-oriented INSET does not stress these kinds of innovative goals. However, the introduction of new items into the curriculum is a good opportunity to introduce new didactical skills or to provide a stimulus to work with new media.

Because of the concern of the INSET-team to keep things close to the daily routine of teachers, an attempt was made to incorporate innovative goals into the development of ready-to-use classroom materials. In this way teachers not only heard how to do it, but got materials to do it with in their own classrooms.

3. The INSET design

From the basic principles mentioned above the INSET-team developed the following design during the FRG-INSET program. The results of the FRG program as well as those of the second experiment confirm the usefulness of the design.

The INSET design consists of the following structure:

Phase I: Planning the organizational structure

This phase can be divided into two major subphases:

a) The creation of the INSET team. In this team three parties should always be represented. First, geographers who are experts in the matter concerned, secondly, "intermediaries" as teacher trainers who are well acquainted with classroom practice and thirdly, teachers working in secondary education.

b) Drawing the time table.

Depending on the ambitions of the team the development of an INSET programme will take about a year and a half. INSET courses should be planned and deadlines for production of teaching materials should be fixed. Time will set boundaries on the variety of materials to be produced. So a first discussion on the final products is necessary.

Phase II: Professionalization of the INSET team

The next subphases are distinguished:

a) Training of team members.

The geography experts take an important role in training the other team members by lecturing and giving hand-outs of relevant literature. These activities aim at getting all team members to the same level of expertise on the subject.

b) Defining teaching materials to be produced.

Team members are complementary in their specialist skills. They discuss each from their own point of view so that the teaching materials are to be produced for the teachers as well as for the pupils. At the same time, a global outline of the contents of the materials is made.

Phase III: Development of the teaching materials.

The next two subphases do not necessaily take place in the same order as mentioned below. They are interchangeable. In developing teaching materials one should use a working model to be able to proceed systematically in the process of creating educational materials.

a) Developing the teacher's kit.

Teacher trainers and teachers of secondary education have an important role in writing and selecting materials useful for the INSET sessions as well as for classroom practice. A separate syllabus can be produced, but it can be combined with the teacher's materials that are mostly developed in accordance with the pupils' materials. The geography experts criticise the raw materials, keeping the geographical content at a high level.

b) Developing the pupils' kit.

The pupil ready-to-use materials are developed in the same way as the teacher's kit. They should consist of a wide variety of media as books, slides, transparencies, software, video-tapes and games.

Phase IV: Implementation of INSET courses

The teacher trainers and teachers of secondary education implement the INSET courses. Each of them is responsible for the whole course. The geography experts in the INSET team can be invited as guest-speakers for a specific part of the matter concerned.

Phase V: Evaluation of the INSET courses

In order to enhance the effects of INSET on classroom practice in the future, two evaluations have to be undertaken:

a) A written evaluation at the end of the INSET course. A questionnaire can be handed out to the teachers.

b) A short questionnaire by mail one year after the INSET course to discern more closely the impact of the course on daily school life.

Phase VI: Reorganization of the INSET design

For each INSET programme there appear to be specific conditions and problems. Clients, e.g. teachers, may have different wishes. The team may be difficult to find and time is always scarce for all the people involved. Certain adaptations in the organizational structure will be necessary for every INSET programme. As one may be involved in any subsequent INSET programmes it is important to adjust the design to the specific circumstances of the INSET to be developed.

4. Two experiments with INSET

Two experiments will be described. Both experiments are subject-oriented INSET programmes on new items of the final O- and A-level geography examinations. The new items were:

a) "Federal Republic of Germany" (FRG) and

b) "Dutch Landscapes" (DL) respectively.

The first item was introduced into the curriculum in 1985/1986; the second one in 1986/1987. The FRG-INSET started in autumn 1984 and courses were repeated in 1985 and 1986. The Landscape-INSET started in the spring of 1986 and was repeated in 1987.

About 500 teachers attended the FRG-INSET. The Landscape- INSET, which is still running at the time of writing, is attended by about 300 teachers.

Courses were offered at a number of centres all over the country.

As will be shown below, both experiments had different organizational structures. The FRG-INSET was directed by the above-mentioned INSET-team which has formulated the new concept for INSET. The DL-INSET was directed by a commission that made use of the experiences of the INSET-team but chose its own organizational structure.

The way in which the organizational structures are seen to influence the evaluation results of INSET will be discussed.

The FRG INSET program

1. Organizational structure and INSET activities

The principles mentioned above have to a large extent determined the organizational structure of the FRG-INSET programme. The INSET-team should become the centre of all activities. The composition of this team consisted of four members who were complementary in their specialist skills.

What specialisations were needed?

a) To make a Syllabus and a multi-media package it was necessary to obtain relevant scientific sources quickly. So, a geography expert of FRG, working at a teacher-training college was to join the team.

b) For the conceptualization of the multi-media kit and the need for intermediaries, two teachers of geography didactics were added.

c) Finally, it is very important to develop INSET courses together with teachers of the target group. So a secondary school teacher of geography was invited to join the team.

The team started work in March 1984 and prepared the INSET courses under the auspices of the Geoplan National Board. Because the board did not want to be responsible for the multi-media kit, the team developed the pupil-materials under the auspices of the University of Nijmegen, which was also prepared to publish them.

The eventual organizational structure is detailed in Figure 41.1:

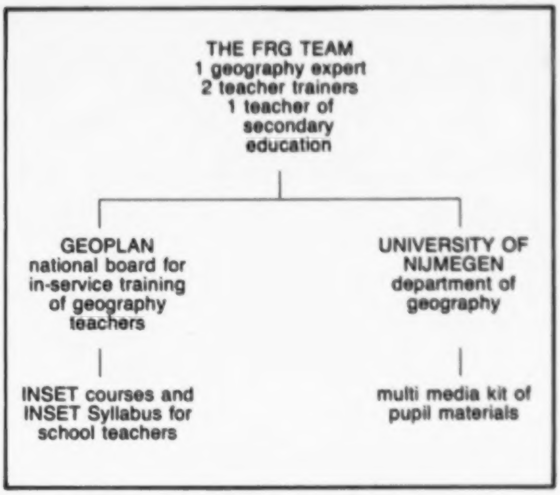

THE FRG TEAM
1 geography expert
2 teacher trainers
1 teacher of secondary education
GEOPLAN
national board for in-service training of geography teachers
UNIVERSITY OF NIJMEGEN
department of geography
INSET courses and INSET Syllabus for school teachers
multi media kit of pupil materials

Figure 41.1 The Organizational Structure of the FRG-INSET

The FRG team worked along the phases of the INSET design suggested above. Once the team was installed, the four members of the team started with the professionalization (phase II) in order to achieve the same level of expertise on the subject. Here:

a) the geography expert taught the other members and selected the relevant books.

b) the team developed an outline for the INSET-Syllabus and the multi-media kit.

Phase III started with the development of the syllabus materials. The multi-media kit was developed afterwards and consisted of:

a) a pupil's book

b) a teacher's guide

c) a series of 48 slides

d) a series of 20 overhead-transparancies

e) a series of 6 videotapes

f) computer courseware.

During phase IV the courses were delivered at 7 locations scattered over the country. Since each member of the team was responsible for one or more locations, they travelled around to serve all teachers.

2. The evaluation (phase V)

a) The standard questionnaire

INSET courses have been evaluated by means of a standard questionnaire given to the teachers just after the INSET course. The total number of teachers attending the FRG-INSET from 1984 until 1986 amounted to 480. The team received back 350 questionnaires, i.e. 73%. For this paper only those questions that give information about the relative success of the FRG-INSET have been selected.

The results are shown in Figure 42.2 below.

Figure 41.2 shows that a large number of teachers evaluated the new concept of the FRG-INSET positively (89.6%). For this question only the answers of those teachers attending previous courses have been selected. The INSET-Syllabus has been evaluated positively too: 78.8% consider it a very good syllabus. In addition, teachers made remarks about the usefulness of the syllabus for their daily work. This is in the same spirit and confirms the percentages in the table. During the

Number of participants: 480
Respondents: 350 = 73%

Questions	Answers in percentages				
	very good	rather good	moderate	bad	non-resp.
This course was different from previous courses. Instead of lectures by different experts there was one teacher trainer responsible for the entire INSET-course. What do you think of this new concept?	89.6%	9.8%	1.6%	—	
	(only teachers who attended previous courses: 297 abs.)				
What is your opinion about the INSET Syllabus?	78.8%	19%	1%	—	1.2%
What is your opinion about other materials you received during the INSET-course?	67.7%	18.1%	4%	—	10.2%
Was the content of the course covered by the official description of the final exam item?	64.4%	12.6%	4%	—	19%

Figure 41.2 Responses of teachers to the evaluation questionnaire on the FRG-INSET

FRG-INSET additional materials were given to the teachers, mostly pamphlets and free booklets offered by German public authorities. Teachers evaluated these materials slightly less positive than the syllabus (67.7%). The last question concerned the relationship between the contents of the INSET course and the subject-content to be taught in the classroom as described by a governmental commission. Taking the categories "very good" and "rather good" together, 77% of the teachers agreed that there was a positive correlation. This result may be influenced by the fact that this question shows a high percentage of non-response.

Although it is important that teachers are satisfied with INSET courses, we still do not know how teachers use their INSET experiences in the classroom. The next section will try to give some tentative answers to the question of the effects of the FRG-INSET.

b) Interviews and extended questionnaire

Looking for effects of INSET in the classroom management of teachers is extremely difficult. In fact, it can only be traced through periods of intensive observation in the classroom, demanding a heavy investment of time. Observations should take place before, during and some time after the INSET programme. Of course, such observations could only be done with a limited number of teachers.

Lack of time forced us to choose the next best option which was to interview twenty teachers one year after the INSET course. They were asked if they used the INSET materials in their lessons and if so, in what way. With the results of these interviews an extended questionnaire was developed and sent to all teachers who had attended the FRG-INSET.

Generally speaking, questionnaires by mail have a response rate of only between 20-30%. In our case 101 teachers out of 440 teachers returned the questionnaire, i.e. 23%. Most of the respondents were experienced teachers (72% have taught for 10 years or more). For most of them (78%), the FRG-INSET was not the first INSET they had attended. For this paper we shall only discuss the answers to the questions concerning the principles of the FRG-INSET.

i) The first basic principle described on page 262 dealt with the relevance of classroom-oriented INSET lectures and a syllabus that could be used in the daily work of a teacher. Asking the teachers what they thought about the classroom orientation of the FRG-INSET, they answered as follows:

1	2	3	4	5
really good				really bad
20%	54%	14%	10%	2%

Of course it is useful to know if teachers not only consider the INSET relevant for their working situation, but also whether they actually use the INSET Syllabus for their lessons.

Out of 100 teachers, 83 used the syllabus. The others thought the syllabus contained too much irrelevant information, so that they lost too much time in using it.

As you can see below the first group of teachers referred to the syllabus mainly when preparing their lessons, copying tables, graphs and maps or just telling their pupils parts of texts.

What do you use the syllabus for?

It can be consulted by pupils in the classroom	3
I copy tables, graphs and maps	42
I tell details during my lecture	45
I refer to the syllabus preparing my lectures	66
I use it in making transparencies	4
I use it in preparing exams	5

The interviews showed the same tendencies.

One of the teachers said: "I just feel safer with this syllabus, the information given helps me in knowing the backgrounds and I can use graphs and maps in my lectures".

In connection with the usefulness of the syllabus we asked if teachers saved time in preparing their lectures. It is interesting that on this aspect opinions differ more than in the case of syllabus appreciation.

1	2	3	4	5
really good				really bad
16%	31%	23%	13%	18%

(n=84)

The explanations teachers gave as to their choice in this question showed that the abundance of information in the syllabus had disadvantages too.

"Looking for the graph you want takes time if the syllabus is too bulky."

ii) The second basic principle described on page 232 suggests that ready-to-use classroom materials should be developed in connection with the syllabus. First we wanted to know if teachers appreciated these materials for their pupils.

Did ready-to-use classroom materials give an extra dimension to the INSET?

1	2	3	4	5
very positive				very negative
17%	48%	21%	11%	3%

(n=95)

It can be said that the majority do appreciate the pupil's kit but of course the next question must be - how many teachers really bought the books and other media for their classroom use? So we asked if the media kit or parts of it had been purchased. The results were as follows:

I bought the complete media kit	13%
I bought parts of the kit	67%
I bought nothing	20%

(n=95)

There is a positive correlation between the two questions.

Only 20% bought anything of the media kit, preferring as they said another pupil's book.

A minority bought the complete kit, which is not surprising because of the wide range of media of the complete kit. Computer software for example is not yet well-known to most teachers so that it is not used very frequently.

Most teachers bought parts such as the pupil's book or the audio-visual materials.

Almost half of the respondents decided to buy the pupil's book for their school.

These teachers were asked if they considered the book sufficiently matched the INSET-Syllabus contents:

1	2	3	4	5
really good				really bad
25%	54%	17%	2%	2%

(n=41)

The interviews we held before showed the same results.

Teachers recognize much of what has been discussed during the INSET sessions. This facilitates working with the pupil's book. Similar conclusions can be drawn from the answers to the questions on the other parts of the media kit. As one teacher told us: "I knew exactly what was coming on the next page of the book."

iii) The third basic Principle dealt with the organizational structure of the INSET course. A FRG-INSET in a given city was conducted by one INSET-teacher who was a teacher-trainer, the "intermediary, that is to say a teacher who knows the daily working situations of teachers in secondary education. Teachers have been asked about their opinion of the FRG-INSET in general after one year of classroom teaching. Their answers were as follows:

1	2	3	4	5
really good				really bad
44%	51%	3%	1%	1%

(n=95)

Their overall impression appears to be very positive even after a year or more. It can be concluded that INSET teaching has been satisfactory. How much of these positive opinions is due to the organizational structure of the FRG-INSET is hard to say. However we asked for the opinion of the teachers on this specific item in the same way as we had done in the standard questionnaire a year before. The response was as follows:

1	2	3	4	5
really good				really bad
42%	52%	4%	2%	-

(n=95)

In comparison with the results of the standard questionnaire (n=350) we can see that their satisfaction has decreased slightly from 98% to 94%. In spite of this change a large majority remains positive about the concept of using "intermediaries" in INSET courses so that trend is not really different.

iv) The fourth basic Principle pursues an innovative objective in classroom management. It has been supposed that using a wide variety of media during the INSET sessions and offering these media in a complete media kit would stimulate teachers to use more media than they usually do. Moreover, we were convinced that by offering concrete media, the possibility to change teaching methods could be easier for teachers. We asked teachers if they used more media in teaching the FRG than they did before and the outcome was as follows:

Yes I did	31%
No I did not	57%
Not applicable	13%

(n=95)

Almost one third of the respondents show a change in their teaching methods by using more media than they did before however, almost 60% said they did not change.

How to interpret this category is speculative. Possibly these teachers use media veryaluation of DL-INSET by standard questionnaire often, or they may not use any media at all and continued not to do so after the FRG-INSET. It is also possible they just do not want to recognize the fact that they hardly used any media beforehand. Nevertheless, that 31% of teachers who did recognize changes in teaching methods is rather encouraging.

In the interviews we heard positive and negative reactions to the media kit: "Pupils do have problems imagining a landscape without slides and using media offers variety in learning activities." But there were also statements such as: "You know, transparencies and slides are great fun for children but you do not improve their learning potential with them."

The general conclusions are that a multi-media kit is highly appreciated and there is some evidence that ready-to-use classroom materials stimulate at least part of the INSET audience to change its teaching methods.

Further details on this subject are at present (1987) being studied.

The Dutch landscape INSET program

1. Organizational structure and INSET activities

The organizational structure of the Dutch Landscapes INSET (DL-INSET) differed considerably from that of the FRG-INSET. As can be seen in the scheme below (See Figure 41.3) there was no such thing as a team developing Syllabus materials or executing the INSET-courses. Instead a coordination commission directed the courses. The commission decided to split up the DL-INSET into two pairs of different courses:

a) one pair of five sessions dealt with thematic problems of Dutch landscapes;

b) the next five sessions dealt with regional aspects of landscapes.

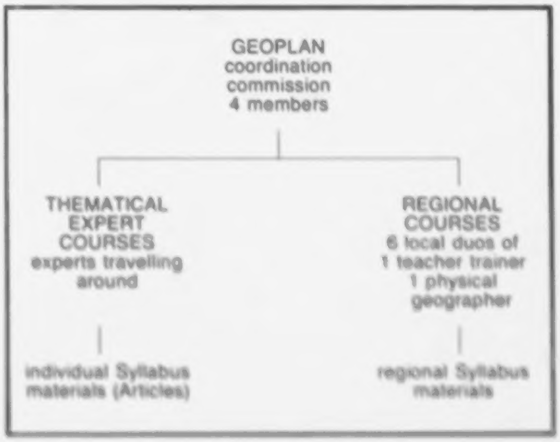


Figure 41.3 The Organizational Structure of the DL-INSET

The thematic expert courses should offer information of a high scientific standard. The coordination commission consequently invited specialists to give a lecture in the thematically oriented courses. Each specialist lectured one session on his or her own. As the INSET courses had to be delivered in a number of different cities all over the country, these specialists had to travel to all the centres in order to give their lectures. The coordination commission looked for the coherence between the lectures.

A more client-centred design was chosen for the regionally oriented courses. Firstly, each INSET-city got its own "local team" consisting of a teacher trainer and a physical geographer. Secondly, these regional courses had to provide a classroom oriented syllabus. Finally, the local teams were in charge of the development and execution of all sessions and teaching materials.

In this INSET program, no pupil media kit was developed.

2. The evaluation

The expert courses as well as the regional courses have been evaluated by a standard questionnaire. Courses were held in 1986 and 987. Teacher satisfaction was measured by asking their opinion of every session. These scores were totalled and resulted in scores for all sessions of the course. Figure 4.4, shows the results.

Thematical Expert Course

Spring 986
(Participants: 75)
(Respondents: 36)

Contents		Presentation
32%	very good	34%
32%	rather good	32%
20%	moderate	18%
6%	bad	6%
10%	miss. val	10%

Thematical Expert Course

Autumn 1986
(Participants: 145)
(Respondents: 88)

Contents		Presentation
34%	very good	34%
26%	rather good	25%
19%	moderate	20%
9%	bad	7%
12%	miss. val.	15%

Regional Courses

Autumn 986
(Participants: 52)
(Respondents: 46)

Contents		Presentation
67%	very good	65%
20%	rather good	17%
5%	moderate	7%
2%	bad	1%
7%	miss. val	8%

Regional Courses

Spring 1987
(Participants: 125)
(Respondents: 102)

Contents		Presentation
68%	very good	67%
16%	rather good	21%
7%	moderate	4%
—%	bad	—%
7%	miss. val.	7%

Figure 41.4 The responses of teachers to the evaluation questionnaire on the Dutch Landscape INSET program

There are striking differences between the thematic expert courses and regional courses:

i) The percentages in the category of "very good" for the expert courses is half that of the regional courses.

ii) The number of teachers who judged the expert courses "moderate" is up to four times higher than in the case of the regional courses. The same can be said for the category of "bad" scores.

iii) It is interesting to notice that there is a strong correlation between the contents of the courses and the way INSET-teachers present their lectures. For example, a bad presentation never corresponds with good content and vice versa. This makes it difficult to compare the teaching abilities of the two categories of INSET-teachers, but this is probably not relevant. It is likely that teachers evaluate more on the criteria of usefulness of the lectures for their daily work. From that point of view it is not relevant if a lecture is well presented or not.

After the first thematic expert course the coordination commission discussed the relatively low scores with the INSET course-teachers. A great deal of time was invested in re-planning the lectures for the next round in autumn 1986. Figure 41.4 shows that this time was non-productive, because no significant changes in the evaluation of the second expert courses can be observed.

It seems that teachers attending INSET-courses do prefer lectures that are strongly related to their daily work. From the experiment with the DL-INSET, the conclusion may be drawn that INSET-teachers, knowing what life in a classroom is like, are to be preferred to experts who are not acquainted with the circumstances in which teachers are working.

Conclusions

The biggest problem facing INSET-courses for teachers is the gap that exists between the daily working situation on the one hand and the content and didactics of INSET sessions on the other. Most teachers ask for practical help in the preparation of their daily tasks. They want a good product that they can use the next day. Client-centred INSET tries to meet these needs of teachers. It accepts the fact that the adults attending the courses just want to acquire knowledge and materials to be used the next day and it therefore relegates more ambitious scientific or pedagogically innovative objectives.

Let us try and draw some conclusions from the two experiments described above.

1. The evaluations of both the FRG-INSET and the DL-INSET suggest that teacher-satisfaction is high when INSET-courses are in the hands of "intermediaries". The DL-expert (thematic) courses scored much lower than the regional courses conducted by teacher trainers. The FRG-INSET has been evaluated very positively

even one year or more after the INSET. The use of intermediaries in particular gained a strongly positive score.

2. The FRG evaluation shows that most teachers are actually using classroom oriented INSET materials (Syllabus etc.) for their lessons. The INSET Syllabus is mostly used when preparing lectures and frequently graphs, maps and tables are copied.

3. Developing ready-to-use classroom materials in connection with the INSET-Syllabus does not seem to have been in vain. Eighty percent of the respondents of the inquiry have bought parts of the multi-media kit. About half of the respondents have purchased the complete multi-media kit.

4. Even limited innovative objectives such as in the FRG-INSET are particially realised. A third of the respondents of the FRG inquiry said they were using more media than they had done before. Slightly more than half of the respondents (57%) said they had not been influenced by the wide variety of media that had been offered.

REFERENCES

Clarembeaux, M. (-) "Une experience de formation continue des enseignants aux moyens audiovisuels et a leur methodologie" in: Vonk en de Vreede (ed.) *Inservice education and training of teachers*, ATEE.

Coonen, H. (1987) *Didaktiek van de nascholing, een introductie*, 's-Hertogenbosch.

Corrigan, D. (1980) *Adult Learning and development, implications for inservice teacher-training*, OECD.

Cruickshank, D.J. (1979) "What we think we know about inservice education", *The Journal of Teacher Education*, 30, 27-32.

Eraut, M. (1982) "What is learned in inservice education and how: A knowledge use perspective", *British Journal of Inservice Education*, 9(1), 6-14.

Giesbers, J.H. (1978) Nascholing van onderwijsgevenden, actuele situatie in Nederland in: Creemers H.P.M. (ed.), *Losbladig onderwijskundig Lexicon*, Alphen a/d Rijn, Samson.

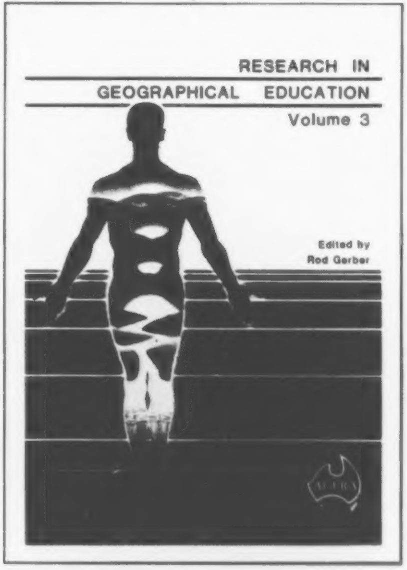
Henderson, E.S. (1978) *The evaluation of inservice teacher training*, London.

Huberman, M. (1985) "What knowledge is of most worth to teachers?", *Teaching and Teachers*, 1, 251-262.

Veen, W. (-) "Experiences avec une nouvelle formule de recyclage: Le recyclage integre" in: Vonk en Vreede (ed.), *Inservice education and training of teachers*, ATEE.

THE LATEST AGERA PUBLICATION

RESEARCH IN GEOGRAPHICAL EDUCATION - Volume 3
edited by Rod Gerber



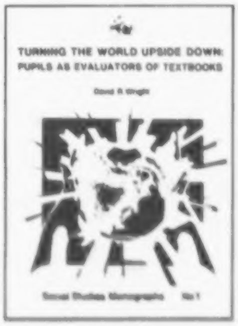
*Another comprehensive volume of research studies including :
Teacher Participation in Curriculum Development in a Third World Country - Mike Morrissey(Jamaica), Research in Humanistic Geographical Education - Helen Ceron/Rob Gilbert(Aust.), Geography for International Understanding - Hartwig Haubrich(FRG), The Influence of Culture, Education and Subject Tradition on Teaching of the Mediterranean in British Schools - David Hall(U.K.), Year 7 Pupils and Mastery of Topographical Mapping Skills - Paul Osborn(Aust.), Distance Education for Teaching Mapping Skills - Paul Anderson(USA), Gifted Children and Mapping - Rod Gerber(Aust.), Variations in Map-drawing Ability of Secondary Students - Philip Stimpson and Stephen Yeung Pui Ming(Hong Kong), Published Sources of Guidance on Atlas Mapwork Skills - Herbert Sandford(UK), Case Study Methodology in Classroom Research - John Lidstone(Aust.).* *(182 pages)*

Price : AUD $12.00 plus postage

THE INAUGURAL SOCIAL STUDIES MONOGRAPH

from BRISBANE C.A.E.

TURNING THE WORLD UPSIDE DOWN : PUPILS AS EVALUATORS OF TEXTBOOKS
by David Wright (University of East Anglia)


TURNING THE WORLD UPSIDE DOWN:
PUPILS AS EVALUATORS OF TEXTBOOKS
David R. Wright
Social Studies Monographs No 1

This is the complete study carried out by David during his time working at Brisbane College of Advanced Education and cited in his chapter in this volume.

A concise account of a method that all geography teachers and their students can use to evaluate geography textbooks. A valuable professional resource . *(24 pages)*

Price : AUD $ 5.00 plus postage

ORDER FORM
(Please copy this form to order these publications)

	Quantity		
RESEARCH IN GEOGRAPHICAL EDUCATION - Vol. 3	☐	$ 12.00	(plus postage)
TURNING THE WORLD UPSIDE DOWN	☐	$ 5.00	

Please send to : Dr. R. Gerber
Brisbane C.A.E.
Victoria Park Road,
Kelvin Grove, Brisbane
Australia 4059

Address for Goods : ....
....
....
....
....

Section F

Research in geographical education

42: RESEARCH IN GEOGRAPHICAL EDUCATION

John G. Lidstone

Although many of us who have devoted much of our professional lives to geographical education would like to claim that research has had a major influence in the development of our discipline, there seems to be little evidence that this has been so. Research in geographical education has had a chequered history and its role in the development of the subject has never been made explicit, although various attempts have been made to identify the direction in which the interests of researchers have been moving and the purposes which have been served by their findings. Interest in the purposes of research in geographical education appears to have begun in early 1945 when (as Scarfe 1949 records) a letter was received by the Geographical Association in Great Britain from the, then, Professor of Methods of Teaching Geography in Moscow asking for an account of any large scale, published or unpublished, objective scientific researches on the teaching of geography in schools. Scarfe comments that, at the time, this request was regarded as being of great significance since it was realized that no complete survey had ever been undertaken, nor, so far as the Association was aware, had there been any convenient summary of the results of such research to which all teachers could have access and from which all teachers could benefit. As a result, the Association decided to survey all teacher training colleges and university teacher training tepartments. With the benefit of hindsight, the letter and the realization it promoted may be regarded as having much broader significance, both for the time at which the decision was made and for the way in which research in geographical education is perceived today.

Firstly, it is interesting that the letter and subsequent Geographical Association survey referred only to "large scale ... objective scientific researches". This implies that only research studies which conformed to these criteria were regarded as being of significance.

Secondly, Scarfe records that the receipt of the letter prompted the Association to realize that there was a need for a summary of such research to be made available for teachers. The significance of this is twofold. There is the tacit acknowledgement that the prime purpose of research in geographical education is to promote improvements in the teaching of geography, but there is also the implication that research is something which is carried out by those outside the teaching profession and the results after interpretation should be presented to teachers as *faits accomplis*.

Thirdly, it is significant that the Association decided to investigate the state of research only through approaches to universities and training colleges and that practising teachers themselves were not approached.

Since this first survey, the topics and approaches to research in geographical education have increased dramatically in scope, but the contribution of such research to the attainment of our aims in geography teaching may still be called to question. This paper explores the nature of skills in research as they relate to geographical education.

What is research and what is a skilled researcher?

In considering the who, what, why and for whom of educational research, Burgess (1985) analysed the papers in a volume entitled *Research Perspectives in Education* (Taylor, 1973). He found that his analysis of the papers and their writers suggested that educational research was confined to professional researchers in higher education working from a sociological, psychological, philosophical or historical perspective, or to those employed in government departments collecting statistical data on which to base future policy or planning. It is perhaps not surprising that looking at a book of such an obviously academic nature led Burgess to this conclusion, but his findings support the assumption referred to above in connection with the Geographical Association survey. The problem appears to lie, not so much in the types of research which have been undertaken, but in the ways in which research has been defined at various stages in the growth of the education industry. Scarfe (1949) in his review of British research in geographical education implied that the Geographical Association survey was too narrow in its scope and noted that, at that time, there had only been three research experiments involving really large numbers of children. He also commented that there had been "several strictly scientific and objective enquiries involving small numbers of pupils but that their results had often been ineffective insofar as their practical value to teachers had been very small". Although he felt bound to emphasise the pre-eminence of the positivist tradition of research, Scarfe was perhaps expressing doubts about the wisdom of this emphasis when he commented that "most of the improvement in the content and methods of school geography in this country has resulted from the subjective experience of practising teachers in the classroom". Naish (1972) also considered the place of teachers' experiences in a research review and suggested that: "It could be argued that most articles on teaching techniques by teachers are, in effect, reports of research, since they are based on the experience of trying out ideas in practice." However, Naish added the rider: "What is lacking is suitably stringent control of the experimental situation".

Despite these acknowledgments of the contributions made by those who have not embraced the techniques of scientific experiment and survey, there still seems to be a tendency amongst many of those who write about research to regard researchers as a breed apart, as experts who have mastered the skills of research and can select and apply them to any problem which they may encounter. The implication is that the essence of "research" lies within the methods adopted.

Figure 42.1 represents a model of the research process which has often been advocated in text books on research.

Walker (1985) suggests that although this model appears to be logical and rational, it frequently fails to reflect the reality of research programmes. In particular, he describes the problems which may be faced in defining the area of research and selecting appropriate methods. Research problems rarely present themselves straight from educational practice in a form appropriate to such research. The realities of classrooms usually have to be ordered and re-ordered before they take on a conformation which makes them amenable to research. Even when a problem has been formulated, it may be that some other "real" problem lies hidden which has not been identified and which will not emerge until the data has been collected and some preliminary interpretations have been made. Walker considers that this situation is evenmore likely to occur when research in commissioned, research has been considered by Barrow (1986). Barrow has made a plea for researchers in education to pay more attention to adequate conceptualisations of the matters being researched. He suggests that the terms "concept" and "conceptualisation" should be clearly differentiated. Barrow gives as examples of these two terms the concept of a "butterfly" and the conception of "democracy". The qualities of the former exist regardless of our attitude towards them, while the latter, by virtue of its abstract nature, is more negotiable. Furthermore, he suggests that the term "conceptualisation" should be used to refer to a conception which can be clearly articulated. Thus conceptualisation involves providing a set of necessary and sufficient conditions that must be met for something to count as an instance of the thing in question. Barrow comments that although philosophers have sought to elucidate various educational concepts, this has yet to be achieved in the same way that there is a nucleus of concepts in relatively well defined areas such as medicine and physics. Thus, while there has been much research carried out on effective schools, little such research has attempted an effective conceptualisation of what it means to be successfully educated. He concludes that empirical research in education would benefit greatly from increased skill in conceptualisation as practised by philosophers. Only by adequately conceptualising the matters under investigation can researchers move on to selecting appropriate methodologies.

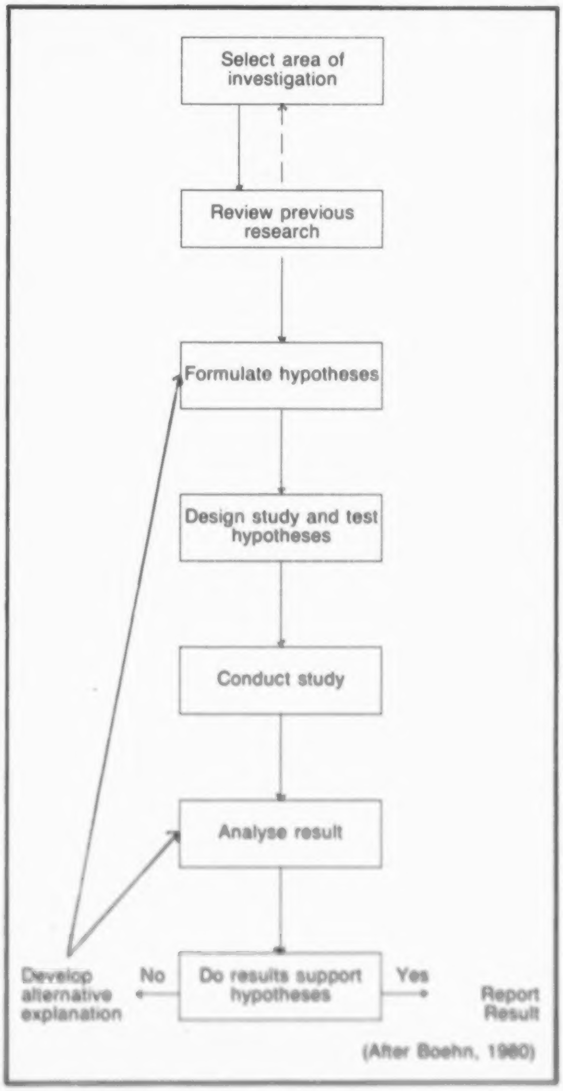

Select area of investigation
Review previous research
Formulate hypotheses
Design study and test hypotheses
Conduct study
Analyse result
Develop alternative explanation
No
Do results support hypotheses
Yes
Report Result
(After Boehn, 1980)

Figure 42.1 A model of an "ideal" research process

It is tempting to go along with Barrow and conclude that once researchers have adequate conceptualisations of their subject matter, then good decisions about methodology will necessarily follow. However, assuming that a clear problem has been formulated in research terms, Walker (1985) points out that the selection of methods with which to pursue the enquiry is unlikely to be an entirely rational response to the specific problem. Researchers tend to favour some methods rather than others. Cohen and Manion (1980) suggest that depending on whether researchers espouse normative or interpretative paradigms of research, they will identify certain issues as being of interest and ignore others; they will adopt certain research methods and reject others; they will show a preference for certain kinds of analysis, explanation and theory. Thus, selecting methods is frequently an act of faith. The methods to be adopted may become part of the fundamental problem, and testing the methods may become as much a part of the research project as the substantive investigation. Thus, when researchers are faced with a particular area of study, they will devote much time and thought to formulating possible and potential research problems which appear to fit their interests and preferred methods. Rather than selecting appropriate methods to find answers to specific questions, their methods may frequently go in search of appropriate problems.

Walker further states that in the context of research, a distinction should be drawn between the use of the word "method" and the use of "methodology". He suggests that "method" should be used to refer to research recipes such as observation, interview, and questionnaire, while a "methodology" should specify methods, but only in order to justify their use for defined purposes in specified situations and circumstances. Thus, part of the skill of the researcher must lie in relating the methods he or she espouses to the selected area of investigation. This is not a simple one-way relationship but a progressive process of refinement. Walker suggests that the emphasis frequently placed on methods should not surprise us since it is in methods that most professional researchers vest their experience.

In addition to researchers' awareness of their own predilections in terms of methodologies, another aspect of skill in selecting appropriate methods is emphasised in a summary of research methods compiled by teachers who wanted to research their own classrooms as part of the Ford Teaching Project and cited by Walker (1985). In describing the advantages and disadvantages of each method, these teachers paid particular attention to commenting on the disadvantages of methods which are unduly time consuming, demanding or cumbersome to use. Such practical considerations represent another facet of the skills required of a researcher. Technically superb methods may be entirely inappropriate if they require more resources of time or money than a research project can support, or if their application will impose unreasonable or unrealistic stress on the participants.

Given the wide range of activities which may be undertaken as part of research, methods which can be used to define research and to differentiate it from other enquiries, there would appear to be a need for more precise definition. Stenhouse (1984) stated that research is "systematic enquiry made public", while Shulman (1980) described research as a "family of methods which share the characteristics of disciplined enquiry". Shulman described the distinguishing characteristics of disciplined enquiry by summarizing Cronbach and Suppes (1969)who suggested that in disciplined enquiry:

1. Arguments and evidence can be examined;
2. It is not dependent solely on eloquence or surface plausibility;
3. It avoids sources of error when possible and discusses margins for possible error in conclusions; and
4. It can be speculative, free wheeling and inventive.

Returning to the distinction drawn earlier between methods and methodology, and in the light of the requirements of disciplined enquiry, it must be concluded that a major skill of research rests not just in adequate conceptualisation of research problems, nor even in knowledge of techniques and procedures for data gathering and interpretation, but pre-eminently in methodology. Kaplan (1973) has described the aim of methodology as being to, "describe and analyse .... methods, throwing light on their limitations and resources, clarifying their presuppositions and consequences, relating their potentialities to the twilight zone at the frontiers of knowledge. It is to venture generalizations from the success of particular techniques, suggesting new applications, and to unfold the specific bearings of logical and metaphysical principles on concrete problems, suggesting new formulations."

The application of this skill can only be judged by reference to the purposes for which research in undertaken and the purposes which its findings ultimately serve. Homans (1962) wrote "People who write about methodology often forget that it is a matter of strategy, not of morals. There are neither good nor bad methods, but only methods that are more or less effective under particular circumstances in reaching objectives on the way to a distant goal." Before investigating the distant goals which may be served by research in geographical education, some consideration will be given to the ways in which such research has been classified in the past.

The classification of research in geographical education

Major reviews and indices of research in geographical education in the United Kingdom have been carried out by Scarfe (1949), Long (1964), Naish (1972), and Corney (1981). Saveland and Pannell (1978) carried out a review of research in the United States on similar lines to that of Naish (1972), while Verbeteel (1987) has reviewed research reported in geographical periodicals in Belgium from 1900 to 1985. The precise intentions of this "research on research" are not always clear. Their obvious purpose is to draw together the findings to date of research on specific aspects of geographical education. However, they may also reveal those aspects of the subject which practitioners feel merit special investigation at particular periods and perhaps pointing to changes in the interests of researchers over time. Furthermore, comparisons between a number of reviews may show ways in which the purposes of research have changed over time.

Each of the reviewers of research in geographical education listed above has felt moved to classify the various studies in different ways. Scarfe (1949) in the first published review of the field discerned a sequential development to the research endeavour and referred to three phases during which the focus of attention moved from the teaching process to the children being taught. In the first phase, Scarfe included those small experiments made in the classroom to improve the techniques of the teacher. He called these experiments the "tricks of the trade" approach. Typically, these studies accepted the content of the subject as fixed and tried to speed the learning process. In his second phase, Scarfe discerned a concern for "psychological factors" which took the form of studies of strictly scientific analyses of the abilities and mental processes which a child needs in order to succeed in geography. Like the small scale experiments described above, these large scale surveys also took the content of geography for granted since the initiative for them came mainly from psychologists and not from geographers, "from detached researchers and not from teachers". The major technique adopted appears to have been the large scale survey subjected to factor analysis and analysis by correlation coefficients. The techniques of large scale investigations were also the basis for Scarfe's third phase of research in which the emphasis changed "from the subject of geography to the children who learn it". These studies investigated the attitudes of children towards the various aspects of the subject and towards the methods children think will help them to learn most effectively.

When Long undertook her review of research in geographical education between 1949 and 1964 (Long, 1964), she discerned traces of each of Scarfe's three divisions, but commented that all aspects of research were by then much more clearly related to psychology. She classified the research according to a fourfold division of psychological studies, and added historical investigation of the development of geographical ideas as a fifth division. Figure 42.2 shows the system of classification adopted by Long.

- Techniques of testing geography;
- Comprehension and testing in geography;
- Interests and attitudes of children towards geography;
- The contribution of geography to international understanding; and
- The development of ideas in geographical education.

Figure 42.2 The system of classification adopted by Long, 1964

With the exception of the section on the development of ideas, all the studies reviewed by Long used either survey techniques on relatively large samples or experimental techniques in which an experimental group and a control group were exposed to different treatments and the effects of each treatment were then measured and compared.

The supremacy of surveys and experimental approaches was again confirmed by Naish (1972). Naish classified British research studies under eight headings with a number of sub-headings shown in Figure 42.3.

- Interest and attitudes;
- International understanding;
- Comparative education;
- Historical development of ideas;
- Assessment and examinations;
- Cognitive development/children's thinking in geography;
- Curriculum and curriculum change:
  - — contemporary positions and possible developments,
  - — links with other subjects,
  - — sixth form colleges, colleges of commerce and polytechnics,
  - — changing relationships between school geography and the changing nature of geography at research level,
  - — the middle years of schooling and the young school leaver;
- Techniques of teaching.

Figure 42.3 The classification of research adopted by Naish, 1972

An examination of the methodologies adopted in studies within each of Naish's classes of research reveals that survey and comparative experimental approaches predominated in all sections with the exception of the historical development of ideas. It should not be assumed, however, that the rather strict definition of research adopted in the reviews mentioned above indicates that attention to other aspects of geographical education was being neglected during this period. Lukehurst and Graves (1972) marked the 22nd Geographical Congress in Montreal with the publication of *Geography in Education: a bibliography of British Sources 1870 - 1970.* This bibliography of some 1400 entries classified not only reports of surveys and experiments, but also more discursive and philosophical papers, articles, dissertations and theses. The classification adopted is shown in Figure 42.4.

- Geography: nature and evolution;
- The curriculum, content and objectives of geography;
- Mental development in relation to geography teaching;
- Teaching methods:
  - — general
  - — the primary age range
  - — the secondary age range
  - — higher education
  - — fieldwork and local geography
  - — the use of maps
  - — text books
  - — the use of other teaching aids;
- Geography teaching overseas;
- Geography and international understanding;
- Testing in geography.

Figure 42.4 The classification of writings on geographical education adopted by Lukehurst and Graves, 1972

More recently the Geographical Association approved the establishment of a *Register of Research in Geographical Education*, from which an Abstract was compiled by Corney (1982). This compiler commented that areas of interest had changed considerably since Naish had prepared his 1972 review, and accordingly proposed a twelvefold classification (Figure 42.5). The first six classes of research group together "the issues normally involved in curriculum planning", while Groups 7 and 8 move to the "broader perspective of geography related to the school curriculum" The final three classifications refer to more discrete areas of geographical education.

1 Curriculum planning in geographical education;
2 Pupils' development
3 Content of geography (related to education):
4 Techniques of studying and teaching geography;
5 Teaching styles and strategies;
6 Examinations;
7 Geography's contribution to the curriculum;
8 Geography and integration;
9 Processes of curriculum development and influences on change;
10 Teachers and institutions (related to geographical education);
11 Geographical studies of education;
12 Geographical education outside Britain.

Figure 42.5 Corney's (1982) classification of research in geographical education based on subject area

In addition to classifying the research studies according to the various subject areas within geographical education, the *Abstract* also codes each study according to the age group of the pupils involved and the research methods adopted. A swift analysis of the research methods adopted (Figure 42.6) reveals that 40% of the 115 studies listed by Corney involved either surveys or experimental work including pupil tests. Furthermore, the *Abstract* reveals that for 37% of the studies the methodology adopted was either not given by Corney's respondents, or had not been determined at the time of compilation, despite the fact that the vast majority of respondents had apparently experienced no difficulty in specifying the scope of their research.

	Number	%
Surveys	33	29
Experiments and pupil tests	13	11
Analysis of literature and secondary sources	12	10
Illuminative/ethnographic	5	4
Classroom observation	2	2
Reflective analysis	3	3
Action research	1	1
Informal trials of materials and feedback	3	3
No methodology given	43	37
TOTAL	115	100

Figure 42.6 The methods adopted in 115 research studies listed by Corney (1982)

With the exception of Scarfe's initial review and Corney's *Abstract*, the main emphasis of each of the analyses of research in geographical education appears to have been on the focus of the investigations rather than on the methods of research adopted, the purpose of the research or the audience for which the results were intended.

The purposes of research in geographical education

While research in the field of education has sometimes been polarized into pure or applied, strategic or utilitarian, or basic and applied, these terms are often unsatisfactory since research studies may simultaneously contribute to theory, policy and practice. The classifications of research in geographical education presented above have usually focussed on specific aspects of the subject, its students and its teaching methods. Other workers have proposed alternative typologies of research.

Bulmer (1978) (summarized in Burgess, 1985b) has proposed a typology of educational research which is based on the purposes for which the research is undertaken rather than the topics of study. The five fold classification is:

- basic social science research,
- strategic educational research,
- specific problem-oriented research,
- action research, and
- the collection of intelligence and the monitoring of trends.

1. Basic educational research is primarily concerned with advancing knowledge through generating, developing and testing theories. In the field of geographical education, work by Graves (1981) on the paradigms of geography, various aspects of curriculum development such as the integration of humanistic approaches with traditions of spatial analysis and regional geography (Ceron, 1983 cited in Ceron and Gilbert, 1987) and articles in books such as that by Huckle (1983) fall into this category. Although the writers of such studies frequently draw conclusions and make recommendations for practice, these rarely reflect the original purposes of the research. Insofar as their work is based on theoretical considerations without direct reference to specific school contexts, those who conduct basic educational research may be regarded as being only tangentially concerned with its practical implications for classroom teaching.

2. Strategic educational research which is based on an academic discipline may also be oriented towards problems encountered in geography teaching. This category includes much of the work of mental faculty psychologists, that of cognitive psychologists based on the ideas of Piaget on the ways in which pupils tackle problems of a geographical nature such as the work on children's understanding of maps (Gerber, 1981, 1987; Sandford, 1972 and this volume), and the large volume of work reviewed by Spicer (1964) on children's and adolescents' perceptions of their environment. Like the basic educational research mentioned above, strategic research does not make a direct contribution to classroom practice, although it may provide valuable information on which classroom

practices may be based. In the case of environmental perception research, Spicer suggests that research in the area seems to have reached a dead end. He cites Olsson's (1968) complaint that although perception studies have contributed to our knowledge, they have made little contribution to geographic theory, and suggests that research in the field has tended to throw light on the perceptual problems rather than the perceivers.

3. Specific problem-oriented research is designed to deal with a practical problem. Such studies include that coordinated by Valussi (1984) to discover how best to introduce hazards preparedness education into Italian schools, the work of the Godfrey Thompson Unit (1968) on evaluating an objective test for the Ordinary level examinations in Scotland and the whole range of research studies which have as their primary objective the discovery of "how to teach ...." This kind of research is frequently referred to as applied research.

4. Action research may be defined as research integrated into a programme of planned change and is often associated with curriculum development. The term may be used to describe a teacher trying out a new approach to teaching a geography topic at one extreme to a national curriculum development project such as the *Geography 16 -19 Project* at the other. Whatever the scale of the undertaking, the fundamental purpose of action research is to add to practitioners' functional knowledge of their profession. The difference between applied research and action research is that while the former is primarily concerned with establishing relationships and testing theories in order to generalise its findings to comparable problematic situations, the latter takes as its focus a specific problem in a specific setting. The emphasis is not on obtaining generalisable knowledge but on precise knowledge of a particular setting and for a specific purpose. It is a moot point as to the stage at which action research projects grow to such a size that they become applied research by producing generalisable knowledge.

Cohen and Manion (1980) have listed five purposes which may be served by action research:

a. to improve, or remedy problems diagnosed in, specific situations;
b. as a means of in-service education whereby teachers may be equipped with new skills or experience-heightened self-awareness;
c. as a means of injecting additional or innovatory approaches to teaching and learning into a system which usually inhibits innovation or change;
d. as a means of improving the normally poor communication between the practising teacher and the academic researcher, and of remedying the failure of traditional research to give clear prescription; and
e. as an alternative to more subjective, impressionistic approaches to problem solving in the classroom.

5. The collection of intelligence and the monitoring of trends is often seen as the preserve of "official" bodies such as national offices of censuses and surveys or other government bodies. Reports of such monitoring are available from the National Assessment of Educational Progress in the U.S.A. (Tyler, 1985), the Assessment of Performance Unit in the U.K. (Livingstone, 1985) and the International Association for the Evaluation of Educational Achievement (IEA: Rosier, 1985). However, it is also probably the most common style of research in geographical education. Surveys of students' perceptions of geography such as those by Fairgrieve (1926), Swainson (1939), Bartlett (1948), Long (1971) and Lidstone (1977) have shown repeatedly that some aspects of geography teaching are more popular than others, while Valussi and his co-workers in Italy (1984) carried out a survey to confirm their impressions that students had only a hazy idea of the causes and wider consequences of the earthquakes which affected their local area. In this last example, the survey revealed the poor state of students' knowledge and led Valussi to conclude that "the problem therefore emerges of inserting this topic into geography courses and of convincing the teachers of the need for it". Gerber (1988) has also carried out an international survey under the auspices of the IGU Commission on Geographical Education of provision for the continuing education for teachers. The purpose of such intelligence and monitor-ing is usually to guide or justify administrative decisions, to be used to justify representations to those in authority, or to identify areas in which such representations should be made.

Various research studies in geographical education have been mentioned above in connection with each of Bulmer's types of research, but it appears that some have closer links with the world of the classroom than others. Elliott (1980) avoids the problem of deciding how relevant particular research studies are to various audiences by drawing a distinction between *educational research* and *research on education*. He suggests that this distinction may be based on the different ways in which the researchers view the classroom. Educational research views the classroom from the the perspective of the participants. Research on education views the classroom from outside. Elliott further suggests that:

- Educational research employs sensitising concepts while research on education employs definitive concepts. He cites Blumer's (1970) explanation that "the definitive concept refers precisely to what is common to a class of objects, by the aid of a clear definition in terms of attributes or fixed bench marks" while sensitising concepts "give the user a general sense of reference and guidance in approaching empirical instances". In summary, definitive concepts tell us what to see while sensitising concepts merely give us a general direction in which to look.
- The different concepts employed by the two types of research imply that research on education will be based on quantitative data while educational research will be based on qualitative data.

- Educational research aims to develop a substantive theory of classroom action while research on education aims to develop a formal theory. Glasser and Strauss (1967) differentiated between formal theory which explains the behaviour of non-natural classes as defined from the perspective of a scientific discipline while substantive theory explains natural classes of action as they are specified by course-of-action concepts.
- Educational research adopts qualitative case study as its principal method of theorizing while research on education adopts the experimental method.
- Educational research in classrooms leads to naturalistic generalisations while research on education leads to formalistic generalization. One generalizes from the case studies of educational research to one's own experience. Generalization is not the task of educational researchers but of their audience: classroom practitioners. Research on education is generalized by the researcher through formal statements and the truth of such statements is validated independently of the audience's experience of classroom life.
- The concepts of educational research are *a posteriori* while those of research on education are *a priori*.
- Educational research in classrooms necessarily involves teachers and pupils as active partners in the research process while research on education treats teachers and pupils solely as the objects of research.
- In educational research in classrooms, the "outsiders'" principal techniques are those of participant observation and informal interview while the principal technique of research on education is non-participant observation using *a priori* categories.

In short, research in education is concerned mainly with an end product, while educational research is an educational experience in itself.

While it may be argued that Elliott is imposing an artificial polarity on the two approaches to research, his classification serves to emphasise one of the differences which may exist between the purposes and audiences of different types of research. Research on education with its definitive concepts is necessary for the development of reliable predictive generalisations. Such generalisations may be essential for planning and policy making at the administrative levels of education, but these activities invariably take place outside the classroom. Within the classroom, teachers have to act and react in relation to particular and constantly changing circumstances which comprise situations, people and events. They need to understand their own unique circumstances. Such understanding may come from a careful consideration of direct experience or from vicarious experiences received as case studies. Blumer (1970) has described such a case study as "an exposition which yields a meaningful picture, abetted by apt illustrations".

Differentiation such as that proposed by Elliott could be taken to imply that qualitative methods should be used when the intended audience of research is teachers, while quantitative methods are more appropriate for administrative or planning purposes. The suggestion is that policy research is different from research which advises practitioners in that it is based on the belief that decision-oriented research can come up with results that can be used to resolve current problems or issues in education (Postlethwaite, 1986). However, this need not necessarily be so. Finch (1982) has commented on the split in academic social science which took place in the 1950s and 1960s when there was a trend towards distinguishing social problems from sociological problems. The result of this split, she avers, was that the former became the province of the discipline of social administration with its empiricist tradition, while the latter came to be regarded as the proper topic of academic study. The same writer suggests (Finch, 1985) that even in the field of social policy, qualitative and quantitative approaches can still be seen as complementary. She quotes James (1977) who stated that ethnography "provides perspective, insight and understandable description" to accounts based on statistical measures or formal interviewing. Such a statement perhaps implies that qualitative studies in the areas of social or educational policy will most appropriately adopt the standpoint of the underdog, making explicit the consequences of decisions made by the socially powerful on the socially powerless. Such problems may face researchers in geographical education engaged in the evaluation of teaching materials, curriculum developments within the discipline or in considering the contribution of geographical ideas to more broadly based social studies courses. Finch (1985) suggests that researchers faced with the problems of maintaining credibility with decision makers while not acting contrary to their own social consciences may adopt one of three strategies:

1. to define themselves as advocates for one aspect of the course or for one group of people they have investigated;
2. to define themselves as the providers of knowledge upon which policy makers and others may act; and
3. to take up a frankly reformist stance and to engage directly in the development of social engineering strategies which attempt to alleviate what they see as some of the worst features which they have identified.

Interpreting research

Despite the differences which have been identified between the purposes and audiences for which research may be undertaken, and despite the differences in research methodology implied by these purposes and audiences, there has been a tendency for the findings of research to be interpreted at both the administrative policy and classroom levels regardless of the methodologies adopted or the original purposes for which the research was undertaken. For example, it has frequently been suggested that survey research has implications for teaching since once the "facts" have been established, remedial or further action can be planned and implemented. What is rarely made explicit is the precise relationship between the objectives of the research, the audience for whom it is intended and with whom the responsibility for remediation or further action rests.

This assertion may be illustrated from work undertaken by the I.G.U. Commission on Geographical Education on teacher style (Stoltman, 1976).

A case study of multiple interpretations of research findings using the SPOTS test

The confusion which may result when purposes and audiences for specific research endeavours are not made explicit may be exemplified from the series of studies based on the "Student Perception of Teacher Style" (SPOTS) test (Steinbrink, 1976) published in conjunction with the 23rd IGU Congress (Stoltman, 1976). Geographical educators in a number of countries were invited to administer the test to students and the results were then presented for international comparison. Although ostensibly the purpose of the studies was to enable international comparisons of styles of classroom management, the various writers invariably commented on what they saw as the implications of the study for their own education systems.

Okunrotifa (1976) from Nigeria, commented: "In many countries, the evaluation of teachers' classroom behaviours has always been based mainly on observations carried out by cooperating teachers, college supervisors or Ministry officials. Such observations are not only expensive in terms of time and money but also in terms of the professional skill demanded of observers. The present study suggested that, by means of student evaluation, it is quite possible to distinguish effective teachers from less effective teachers without observing them while they teach. .... Student evaluation could be a useful, convenient, reliable and valid means of evaluating teachers' classroom behaviours."

Knight (1976) from New Zealand, commented on implications of the study for:

- the training of geography teachers: "the *a priori* expectations that geography teachers involved pupils in independent scientific research into the environment was not supported. ... the data ... suggested that the teaching of geography teachers should place more emphasis on methods of deformalising the classroom";
- classroom style: "The anxiety of teachers to cover the School Certificate of the U.E. Syllabus is at present depriving pupils of the opportunity of developing personal autonomy and responsibility"; and
- curriculum planners: "The effect of curriculum design on teaching strategies was quite evident from the data. The use of national syllabuses examined by national examinations results in the development of a national style of geography teaching.

Slater (1976) in the United Kingdom commented that:
"a much larger and more representative sample would be required before firm conclusions could be made" but went on to suggest that "an introduction to and a participation in group work is necessary and highly desirable in the training of geography teachers. This, in turn, would have its impact on classroom teaching style in the control and interaction modes. If newly developed English curriculum materials partly organized around group work and tasks are to be used effectively, then teacher training must alter the behaviour of teacher-trainees to accommodate that group work. Schools also need to be more flexible to accommodate that group work. However, it can be readily acknowledged that the skilled, motivated and dedicated teacher can organize highly effective group work despite restraints".

Chu (1976) in Hong Kong was more cautious. Although he noted that "one would need to analyze the traditional roles of males and females in Hong Kong schools and the roles of the sexes in general" and asked "did male teachers in the sample instruct somewhat different types of students which would result from grouping on some external criteria?", he considered that the SPOTS instrument had potential as a teacher feedback system in Hong Kong. Chu commented that the teachers in his sample "were able to compare their classroom styles with the sample of Hong Kong geography teachers. They were also able to make inferences regarding areas of agreement and disagreement between perceptions of their own classroom style and perceptions held by students. This feedback, along with necessary instructional assistance, could encourage teachers to improve their classroom style".

Finally, Choquette (1976) from Quebec also considered that the implications of SPOTS lay primarily in the province of the individual teacher: "le questionnaire SPOTS peut devenir un outil d'introspection interessant pour un professeur evoluant selon un cadre d'enseignement non directif".

The findings which were based on data collected using the same instrument in various countries were used by the various researchers as the basis for conclusions with implications at scales ranging from that of the individual teacher to matters of national policy. In the light of the various analyses, Stoltman (1976) concluded that the message of the data for individual teachers was the most significant contribution of the research and emphasised the importance of the many and varied influences, varying from the teacher's own personality to the specifics of the school system, which impinge on the behaviour of teachers in their classrooms. However, while Stoltman exerted a moderating influence on the interpretation placed on this research, and emphasized its potential contribution to educational research, many similar studies are published in which conclusions are drawn which are not fully supported by the data.

It is tempting to conclude from the example above that skilled researchers should be required not only to make explicit their conceptualisations of the focus of their concerns and justify their methodologies, but also to clarify the audiences for which their studies are intended. However, such requirements would not necessarily ensure that research studies contribute to the improvement of geographical education.

What should be the contribution of research to geographical education?

It has been a fundamental premise of this chapter that much of the research which has been conducted in geographical education has not made major contributions to the improvement either of geography as taught in schools or of education systems in general. Graves (1982) considered three criticisms of such research.

In responding to the criticism that many research findings are so trivial or obvious that the research may not have been worth undertaking in the first place, Graves suggested firstly, that the acquisition of evidence to support some assertion which was made previously based solely on individual experiences is valuable *per se*, and secondly, that when a teacher carries out such research related to a particular problem which he or she perceives as being important, then the benefits to that teacher may be considerable.

To the charge that some research is of an esoteric nature or divorced from day-to-day classroom problems, Graves replied that while research into long term trends or large scale influences may not be of direct help to teachers today, it may help teachers to be critical in their adoption or rejection of newly presented aims of geographical education and to consider such questions as "Why am I teaching this?" and "How valuable is this for my pupils?"

Finally, regarding the alleged incomprehensibility of many research reports, Graves suggests that the accusation often refers to large scale empirical research involving psychometrics and that much of this research is summarized in less technical language in journals directed at teachers.

Perhaps the main problems afflicting the potential contributions of research to geographical education stem from the expectations of those who may be regarded as the consumers of research findings. It appears to be a hallmark of the 1980s that workers in many areas have realised that an excessive respect for experts has had a disabling effect on society. In childrearing and in health at one end of the scale to economic development at the other, many workers have discerned a need for individuals to take control once again of their own destinies. In education, too, teachers may have developed unreasonably high expectations of what research can achieve.

Reilly (1986) reports an attempt in North Carolina to create a clearing house for research in education. A survey was conducted in which all the school systems in the state were asked to provide a list of questions, topics, issues and needs with which they were faced and for which they needed answers. The answers showed a high level of overlap. At the same time, a second survey was conducted to elicit a list of educational research projects, funded or not, past present and proposed. The hope was that classroom practitioners could be put in touch with those who had, were, or expected to, conduct research in an area of need. Reilly suggests that the scheme failed because there was no concordance between the research being conduct- ed and the expressed needs of the practitioners. This need not necessarily be the case. Whatever else is not known about the education process, there seems to be enough evidence for us to conclude that there are few simple answers to particular problems. The number of variables operating in the educational system ensures that any attempt to simplify the complexity will fail. Zahorik (1984) summarizes the assumptions which he sees as standing in the way of useful research on teaching:

1. that some ways of teaching are more effective than others;
2. that research can reveal effective and ineffective ways of teaching;
3. that teachers will accept effective ways of teaching as revealed by research; and
4. that teachers are able to employ effective ways of teaching as revealed by research. (Zahorik, 1984)

The answer to the problems would seem to be for many more teachers to be involved in research, not in the menial capacity of data collection, but where the teacher is either involved in a project guided by an academic researcher, or by working with a researcher in a school-based project. In this way, researchers may bring to the study, resources such as time, specialist knowledge of methods which may not otherwise be available, and a fresh view of the situation, while the teachers can bring their detailed knowledge of the context of the study, their practical expertise and their perceptions of areas of concern.

Such an approach may be accused of representing only a limited view of research such as those approaches subsumed under Bulmer's specific problem orientated research and action research categories. However, it is hoped that by greater involvement in these types of research, what Walker (1985) has called a "community of knowledgeable users" may emerge. Such an approach does not assume that teachers should always generate their own research problems, although the large amount of research generated by those following higher degree courses is usually based on the personal interests of the students. Nor does it assume that the research should always be approached solely from the practitioner's viewpoint. Policy makers frequently require information about a programme for evaluation and accreditation purposes. In both these cases, however, the teachers should be collaborators in the research: in the former case, higher degree students work under the guidance and supervision of experts in the field; in the latter, although the initial motivation for the research may emanate from professional researchers, teachers should be fully informed about its purposes and should be part of the planning team which translates the idea into practice.

These two approaches may be exemplified from the writer's own recent experiences. Research undertaken with the London University Institute of Education involved a number of teachers in various schools in a detailed ethnographic study of their use of text books in geography teaching (Lidstone, 1985). The teachers who agreed to help in the study were aware from the outset that the primary purpose for which the research was undertaken reflected the particular interests of the researcher. With this in mind, the researcher and teachers could discuss freely the approaches to be adopted in the study, the areas which were felt by teachers to be "out of bounds" and eventually, the interpretations which could reasonably be placed on the findings. A number of the teachers reported that they had reached new understandings of their own teaching through helping with the study, and others may gain their own understandings from the case studies and interpretations contained in the report. Despite all such benefits, the main purpose of the research was the understanding of the researcher. One learns by doing.

In a second study, (Lidstone, 1987) the writer was asked to undertake an evaluation of a proposed semester-long course for senior geography students in Queensland. Once again the teachers were fully appraised of the purposes of the research which were to inform validating bodies within the Queensland education system. The methods of data collection adopted were very similar to those of the earlier study. However, since it was the course which was the focus of the research and not the teachers, the role of the teachers in interpreting the findings was increased in importance. The discussions involved in this interpretation were of great interest to the teachers who had undertaken the pilot semester themselves and the case studies presented as part of the final report were written in consultation with them. The report was presented in such a way that the information required by the various committees who had to decide whether or not to accredit the course were separated from the case studies which were seen as being of greatest use to other teachers who will be teaching the course in the future.

Such collaborative ideas are, of course, implicit in action-research projects, particularly those engaged in curriculum development activities such as the *Geography 16 - 19 Project*, the operation of which in Sheffield, England, is described in greater detail by Hebden and Fyfe (below). Many of the principles of collaboration are also relevant, however, when the objects of research include the effects of change in schools, self-evaluation and management development. Oldroyd and Tiller (1987) describe the role played by one of the authors who became "researcher-consultant in residence" at a school in western England. While these experiences grew to embrace action research with the intent to facilitate change, the initial stages of the work involved an investigation of the main areas of concern of both teachers and pupils.

Finally, in this plea for greater teacher involvement in research what is to be the fate of Bulmer's basic social science research? It has already been said that the complexity of the teaching process is such that the findings of research are unlikely to present specific answers or explanations for the matters of concern to teachers. The present writer found a wide range of research studies with some bearing on his interest in exploring the ways in which geography teachers use text books (Lidstone, 1985). The range of experimental work pertaining to text books is summarized in Figure 42.7 While the ethnographic studies offer no direct guidance on ways in which text books could contribute to more effective geography teaching, it was found very helpful to examine them in the light of the experimental research from particular disciplines. Such an approach increases understanding in two ways.

Firstly, reviews of research frequently reveal findings which are equivocal from one study to another. It is tempting to conclude that such research is inconclusive due to a lack of rigour, but when related to the highly interactive environments of classrooms, such inconsistencies may be regarded as the inevitable concomitants of work in such a complex area. Thus, illuminative research takes the role of validating basic research in a number of classroom ecologies.

Secondly, it would be surprising if basic research were to reach conclusions which are not in accord with the intuition of those who are masters of their craft. There does not seem to be any good reason why experimental research should present surprises. Rather, it may be expected to support practitioner intuitions and perhaps offer explanations for behaviours which have been found to be expedient in specific circumstances. If this second contention about the relationship between basic research and illuminative research is accepted, then basic research may be expected to offer explanations for identified classroom practices. In this latter case, experimental research findings are interpreted in a manner similar to as rabbinical interpretations of prophecy.

Conclusions

Research in geographical education, like that in most other areas of education, does not seem to have been very well received by the teaching community nor does it seem to have had a great influence on policy makers. Such a situation is obviously not very satisfactory, but the remedy is likely to be complex. While researchers need to be punctilious in clarifying their purposes, making their conceptions explicit, justifying their methodologies and considering their potential audiences, a considerable responsibility must also rest with those who would use the results of their research. An exact correspondence between the perceptions of researchers, policy makers and practitioners is an ideal which can probably never be attained. What is needed is a greater level of understanding of what can reasonably be expected of research. With such understandings, the antipathy between the roles of researcher, practitioner and policy maker may be reduced and we may yet achieve a community of knowledgeable users in geographical education.

Case studies and applications

The studies included in this section reflect the diversity of research topics and methods in use around the world. The first two papers describe the patterns of research in geographical education which have emerged in the United Kingdom and in Nigeria.

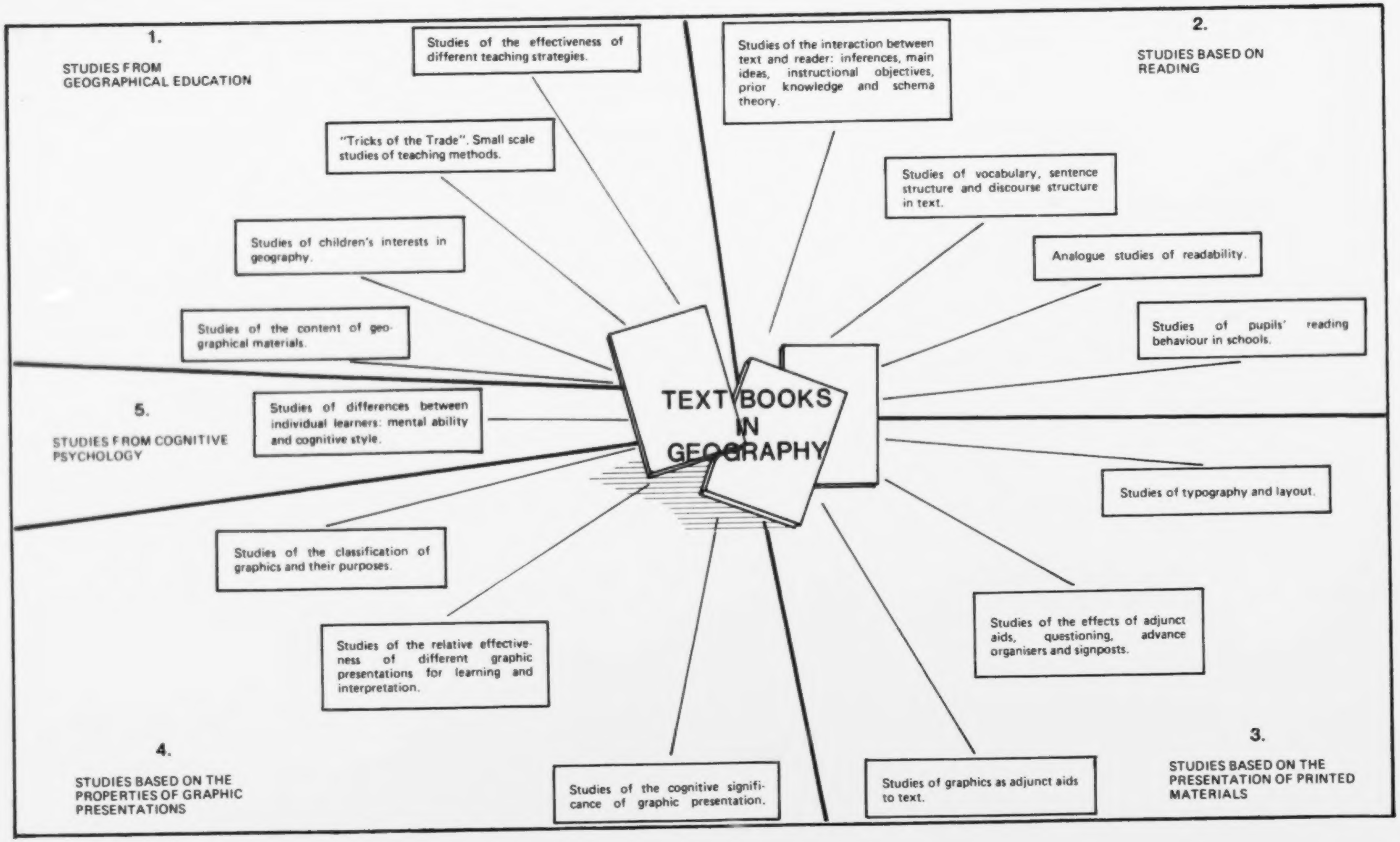

1.
STUDIES FROM GEOGRAPHICAL EDUCATION
Studies of the effectiveness of different teaching strategies.
"Tricks of the Trade". Small scale studies of teaching methods.
Studies of children's interests in geography.
Studies of the content of geographical materials.
2.
STUDIES BASED ON READING
Studies of the interaction between text and reader: inferences, main ideas, instructional objectives, prior knowledge and schema theory.
Studies of vocabulary, sentence structure and discourse structure in text.
Analogue studies of readability.
Studies of pupils' reading behaviour in schools.
TEXT BOOKS IN GEOGRAPHY
5.
STUDIES FROM COGNITIVE PSYCHOLOGY
Studies of differences between individual learners: mental ability and cognitive style.
Studies of typography and layout.
Studies of the classification of graphics and their purposes.
Studies of the relative effectiveness of different graphic presentations for learning and interpretation.
Studies of the effects of adjunct aids, questioning, advance organisers and signposts.
4.
STUDIES BASED ON THE PROPERTIES OF GRAPHIC PRESENTATIONS
Studies of the cognitive significance of graphic presentation.
Studies of graphics as adjunct aids to text.
3.
STUDIES BASED ON THE PRESENTATION OF PRINTED MATERIALS

Figure 42.7 The areas of research which contribute to a study of the role of text books in geography teaching (Lidstone, 1985)

RALPH HEBDEN and **ELSPETH FYFE** present a synthesis of research in geographical education in the United Kingdom during the 1980s before considering the implementation of the *Geography 16 - 19 Project* in their local area: Sheffield. They show how the action research model developed in the United Kingdom and describe the processes of what has become the most successful research-based curriculum development project in geography as they were experienced in a single local authority area.

JULIE OKPALA provides a synthesis of research in geographical education in Nigeria over the same period and makes a number of comments to explain the styles of search which are so frequently adopted. Julie then goes on to analyse a typical research project as undertaken in Nigeria and shows how such studies may fail to lead to the desired improvements in the geographical education of students.

GUNTER NIEMZ provides a case study of a large scale survey undertaken in geographical education. Gunter explains how concerns expressed by those inside and outside the educational systems of West Germany about the geography curricula introduced in the 1970s created a need for information on the nature of school geography. He provides considerable substantive detail of the current state of geography teaching in West Germany.

ANN VERHETSEL from Belgium gives us a case study of diagnostic experimental research on cognitive maps and the ways in which students structure "the world in our head". Ann explains her hopes that the results of the experiments may be used to create a tuition programme for "spatial education".

DAVID WRIGHT from England presents a persuasive case for small scale classroom research that focusses on students and teachers as evaluators of geography text books. Such approaches are pre-eminently research as education and David presses for the inclusion of these techniques in teacher-education courses.

BERT SANDFORD, in his study of students using maps through free and directed searching techniques re-emphasises the need for geography teachers to become researchers. A feature of Bert's chapter is the series of suggestions for using the research findings to help students learn to use maps effectively.

PHILIP STIMPSON uses a study carried out in Hong Kong to gather data on teachers' perceptions of a new geography curriculum to demonstrate how to gain the maximum amount of information from questionnaire surveys. Philip acknowledges that such surveys are "seductive in their appeal", and makes an appeal for stringency in their use to avoid drawing unrealistic conclusions.

LEA HOUTSONEN analyses the diffusion of a new geography curriculum in Finland by using students' question choices in their school-leaving examinations. Lea shows how a number of measures were used to validate the analysis of the examination scripts and draws our attention to a number of interesting correlates in the adoption of innovative curricula in Finland.

JOE STOLTMAN AND ROBERT FREYE conclude the section with some comments on a replication study of school atlases currently in use with middle and lower secondary students in the United States. They use a technique developed by Bert Sandford to analyse atlases and are able to make a number of suggestions for the future design of atlases for their students. The application of this technique emphasises ways in which progress in geographical education may be encouraged by international exchanges of ideas.

REFERENCES

Barrow, R. (1986) "Empirical research into teaching: the conceptual factors", *Educational Research*, 28(3), 220 - 230.

Bartlett, D.B. (1948) *An investigation into the attitudes of boys and girls towards the content of, and the methods of, teaching geography in grammar schools*, Unpubl. M.A. dissertation, University of London.

Blumer, H. (1970) "What is wrong with social theory?" in Filstead, W.J. (Ed) *Qualitative Methodology*, London, Rand McNally.

Bulmer, M. (Ed)(1978) *Social Policy Research*, London, Macmillan.

Burgess, R.G. (Ed) (1985a) *Strategies of educational research*. Lewes, The Falmer Press.

Burgess, R.G. (Ed) (1985b) *Issues in Educational Research*, Lewes, The Falmer Press.

Ceron, H. (1983) *Goals and student antecedents in curriculum development in humanistic geography*, Unpubl. B.Ed.(Hons) thesis, Townsville, James Cook University of North Queensland.

Ceron, H. and Gilbert, R. (1987) "Research in humanistic geographical education: an example and some critical comments" in Gerber, R. (Ed) *Research in Geographical Education*, Brisbane, Australian Geographical Education Research Association.

Choquette, R. (1976) "Use of the SPOTS as a device for pedagogical self appraisal: the experience of a teacher in the Province of Quebec" in Stoltman, J. (1976) *op.cit.*

Chu, S.K. (1976) "Hong Kong students' perceptions of secondary geography teachers' classroom style" in Stoltman, J. (1976) *op.cit.*

Cohen, L. and Manion, L. (1980) *Research methods in education*, London, Croom Helm.

Corney, G. (1982) *Register of Research in Geographical Education*, Sheffield, Geographical Association.

Cronbach, L.J. and Suppes, P. (Eds)(1969) *Research for tomorrow's school: disciplined enquiry for education*, London, Macmillan

Ebbutt, D. (1985) "Educational action research: some general concerns and specific quibbles" in *Burgess* (1985), op.cit.

Elliott, J. (1980) "Classroom research: science or commonsense?" in *Understanding Classroom Life*, London, N.F.E.R.

Fairgrieve, J. (1926) *Geography in School*, London, University of London Press

Finch, J. (1982) "The sociology of welfare" in Burgess, R.G. (Ed) *Exploring Society*, London, British Sociology Society (Second edition published 1986, London, Longman.

Finch, J. (1985) "Social Policy and Education: problems and possibilities of using qualitative research" in Burgess, R.G. (1985b) *op. cit.*

Gerber, R.V. (1981) "Childrens' development of competence and performance in cartographic language" in Wilson, P., Gerber, R. and Fien, J. (Eds) *Research in Geographical Education*, Brisbane, Kelvin Grove C.A.E.

Gerber, R.V. (1987) "Gifted children and their development of understanding maps" in Gerber, R. (Ed) *Research in Geographical Education*, Brisbane, Australian Geographical Education Research Association.

Gerber, R.V. (1988) "International survey on Continuing Education for Geography Teachers", in Biilmann, O., Gerber, R., and Williams, M. (Eds) *Developing Models for the Continuing Education of Geography Teachers*, Brisbane, IGU Commission on Geographical Education

Glasser, B.G. and Strauss, A.L. (1967) *The Discovery of Grounded Theory: strategies for qualitative research*. Chicago, Aldine Press.

Godfrey Thompson Unit for Educational Research (1968) *An experimental test of geography at the Ordinary grade of the Scottish Certificate of Education*. Edinburgh, University of Edinburgh.

Graves, N. J. et al. (1982) "Research in Geographical Education" in *Geography in Education* Now, Bedford Way Papers 13, London, Institute of Education, University of London.

Homans, G.C. (1962) *Sentiments and activities*, New York, The Free Press of Glencoe.

Huckle, J. (Ed) (1983) *Geographical Education: Reflection and Action*, Oxford, Oxford University Press.

James, J. (1977) "Ethnography and social policy" in *Weppner*, R.S. (Ed) Street Ethnography, Beverley Hills, California, Sage.

Kaplan, A. (1973) *The conduct of inquiry* Aylesbury, Bucks. Intertext Books.

Knight, C. (1976) "Pupils' perception of teacher style: Cyprus" in Stoltman, J. (1976) *op.cit.*

Lidstone, J.G. (1977) *An evaluation of the geography curriculum offered to second and third year pupils in a south London junior high school*, based on volumes two and three of the Oxford Geography Project text books, Unpubl. M.A. dissertation. University of London.

Lidstone, J.G. (1985) *A study of the use of geography text books by selected teachers in English secondary schools*, Unpubl. Ph.D. thesis. University of London.

Lidstone, J.G. (1987) *An evaluation of Senior geography Syllabus IIIB: Australian Geographical Inquiries*. Brisbane, Board of Secondary School Studies.

Livingstone, I.D. (1985) *Standards, national: monitoring*, in International Encyclopoedia of Education, Oxford, Pergamon.

Long, M. (1964) "The teaching of geography. A review of recent British research and investigation", *Geography*, 49, 192 - 205.

Long, M. (1971) "The interests of children in school geography", *Geography*, 56, 177 - 189.

Lukehurst, C. T. and Graves, N. J. (1972) *Geography in Education: A Bibliography of British Sources 1870 - 1970*, Sheffield, The Geographical Association.

Naish, M C. (1972) "Some aspects of the study and teaching of geography in Britain: a review of recent British research", *Teaching Geography Occasional Papers No. 18*, Sheffield, The Geographical Association.

Oldroyd, D. and Tiller, T. (1987) "Change from within: an account of school based collaborative research in an English secondary school", *Journal of Education for Teaching*, 12(3), 13 - 27.

Olsson, G. (1968) *Geography 1984*, Seminar paper series A7, University of Bristol, Department of Geography.

Okunrotifa, P.O. (1976) "Student perception of teacher style: Nigeria", in Stoltman, J. (1976) *op.cit.*

Postlethwaite, T.N. (1986) "Policy-oriented research in education", *Oxford Review of Education*, 12(2), 135 - 151

Reilly, D. H. (1986) "Educational research: leader or non-participant in educational decision making", *Educational Research*, 107(2), 155 - 160.

Rosier, M. (Ed)(1985) *IEA: activities, institutions, and people*, Oxford Pergamon.

Sandford, H.A. (1972) "Perceptual problems", in Graves, N.J. (Ed) *New Movements in the Study and teaching of Geography*, London, Temple Smith.

Saveland, R.N. and Pannell, C.W. (1972) "Some aspects of the study and teaching of geography in the United States: a review of current research 1965 - 1975", *Teaching Geography Occasional Papers No. 30*. Sheffield, Geographical Association.

Scarfe, N.V. (1949)"The teaching of geography in schools. A review of British research", *Geography*, 34, 57 - 65.

Shulman, L.S. (1980)Study guide and audiotape for disciplines of inquiry in education", in *American Educational Research Association, Alternative Methodologies in Educational Research*, New York, AERA.

Slater, F. (1976) "Student perception of teacher style in geography: an exploratory study in London" in Stoltman, J., (1976) *op. cit.*

Spicer, B. (1984) "Research methods in investigating childrens' and adolescents' perceptions of their environment" in Graves, N.J. (Ed) *Research and Research Methods in Geographical Education*, London, University of London Institute of Education.

Steinbrink, J. (1976) "Researching instructional style and classroom environments: a survey of techniques" in Stoltman, J., (1976) *op.cit.*

Stenhouse, L. (1984) "Evaluating curriculum evaluation" in Adelman, C. (Ed) *The Politics and Ethics of Evaluation*, London, Croom Helm.

Stoltman, J. (1976) *International Research in Geographical Education*, Kalamazoo, MI., Western Michigan University, on behalf of the Commission on Geography in Education of the International Geographical Union.

Swainson, B.M. (1939) "An enquiry into likes and dislikes of elementary school children in geography", *Geography*, 24. 109 - 125.

Taylor, W. (Ed)(1973) *Research perspectives in education*, London, Routledge and Kegan Paul.

Tyler, R.W. (1985) *National assessment of educational progress* (NAEP), International Encyclopaedia of Education, Oxford, Pergamon.

Valussi, G. (1984) "The perception of hazards in geographical education: research methods", in Graves, N.J. (Ed) *Research and Research Methods in Geographical Education*, London, University of London Institute of Education.

Verhetsel, A. (1987) "Educational Geographical Research in Belgium: a marginal point of interest" in Haubrich, H. (Ed) *International Trends in Geographical Education, Freiburg*, Published by the Editor on behalf of the International Geographical Union Commission on Geographical Education.

Walker, R. (1985) *Doing Research*, London, Methuen.

Zahorik, J.A. (1984) "Can teachers adopt research findings?" *Journal of Teacher Education*, 35(1), 34 - 36.

43: RESEARCH IN GEOGRAPHICAL EDUCATION IN THE UNITED KINGDOM

Ralph Hebden and Elspeth Fyfe

The growth of geography as an academic discipline is concentrated in the universities in Britain. Traditionally, it has been the universities which have undertaken research and developed new concepts, models and skills which have then been passed on to their undergraduates. These undergraduates have then formed the next generation of school teachers who "trickle down" to schools, changes in academic content. The universities also exert strong control over the school examination system and can bring about changes in academic content in schools by changing school examination syllabuses. The university geography departments themselves have no tradition of research or concern for how content is taught, i.e. education in the sense of teaching strategies and methods.

The training of school teachers was the concern of university education departments and colleges of education during the 1970s. Some had specialist geography staff. The emphasis of these departments and colleges has traditionally been upon professional training with limited research. The little research which was undertaken concentrated on the contribution of the various disciplines within education such as sociology, philosophy, psychology and history. The study of curriculum areas such as geography had always had limited research development.

The 1970s produced a change in this dichotomy between academic development and professional development. The expansion of school geography in the 1960s had led to expansion in geography departments in colleges of education. Some, such as Sheffield City College of Education, had over ten members of staff training geography teachers and the potential to develop research in geographic education was grasped. At the same time, Local Education Authorities found the need for school advisers in each specific subject area. About one-third of the Local Education Authorities in England appointed geography advisers. Furthermore, the Schools Council launched two curriculum projects with a clear geography focus. These were *Geography for the Young School Leaver* and *History, Geography and Social Studies* (for 8-13 year old pupils).

Geography for the Young School Leaver (GYSL) provided an opportunity for all these people to combine in a curriculum project for 14-16 year old pupils. The central team of four consisted of school teachers and two college lecturers. Research and evaluation of the project was undertaken by a college of education. A network of schools was involved in trialling teaching materials for the project. This involved school teachers, college lecturers and Local Authority advisers. Regional and local curriculum groups of teachers were formed with university geography education lecturers, college geography lecturers and local authority geography advisers helping to co-ordinate these groups.

In effect, a curriculum network was established with an action research approach. The success of GYSL has meant that other curriculum projects and initiatives have used this model. The result is that research is no longer a personal venture done by a researcher about other peoples' activities. Instead, research is seen as an ongoing activity of the professional teacher as part of the teaching task. This interactive research mode is now an important process within the school teaching profession in Britain. As such it must influence any review of geographical education research in the 1980s.

Action research curriculum model

A study of GYSL provides the basis for formulating the action research curriculum model presented as Figure 43.1. When teachers are considering what to teach and how to teach it they have to make a decision as to whether they will continue to teach as in the past or make some changes. If they decide to change they will search for new materials and possible teaching methods, evaluating what is available to them until they find some material which they find acceptable. Once this stage is reached, they need to ensure that the material is adequate for their purposes and make the appropriate organisational changes to teach the material by what they consider to be the best methods. After trying the materials and methods in the classroom (trial implementation) they can reject them or decide they have been a success and use them again (sustained implementation).

Finally, they adopt the materials and methods as a normal part of their teaching programme (institutionalisation). This whole process is more successful if supported by a curriculum group, of which the teacher is a member, and if the group has access to new curriculum materials with suggested teaching methods, either from published sources or by producing them themselves.

From the curriculum development movement in geography which developed in the 1970s, teachers in schools were led to adopt certain clear expectations from

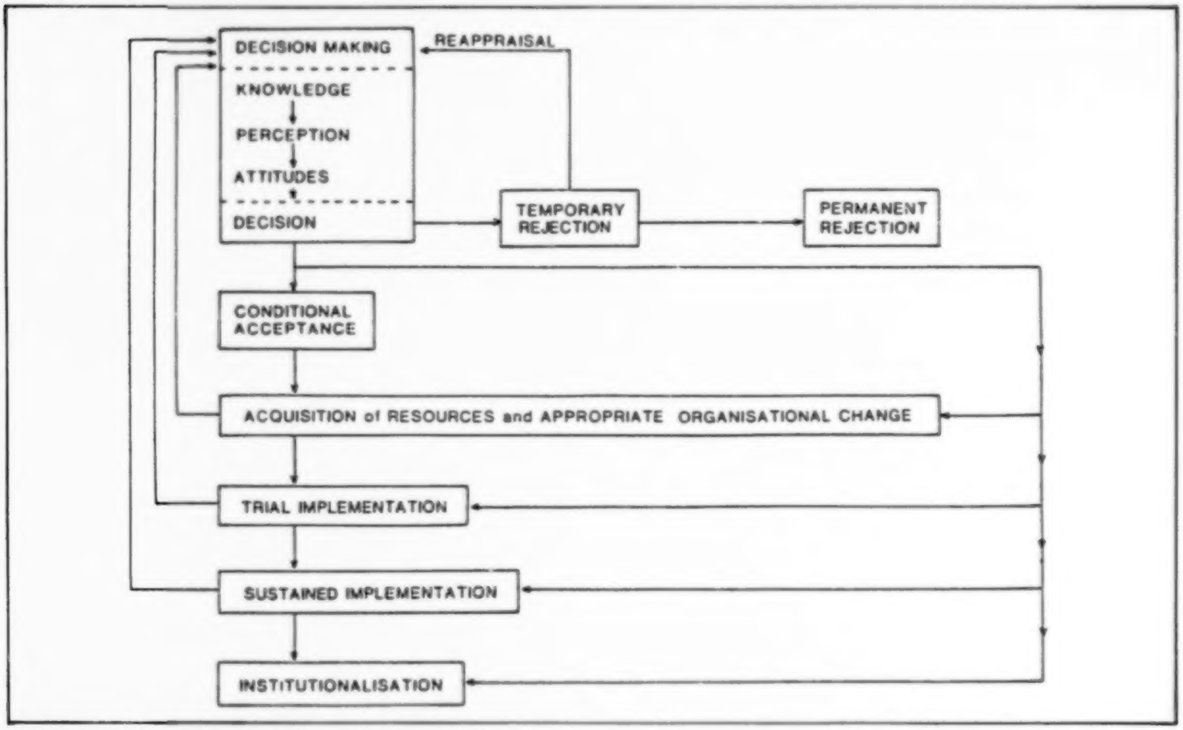


Figure 43.1 An action research curriculum model

the educational system in terms of materials and teaching methods. One must pose the question, did the early 1980s meet these expectations? The output of books and journal articles can be examined in the light of these expectations.

Review of 1981-5 literature

1. Background

Reviews of research in geographical education have been made on a number of occasions over the past twenty years. Long (1964), Naish (1972), Corney (1982) and Spencer and Hebden (1982) have all produced reviews. Their formats and purposes have varied but their compilation demonstrates that much has been written about geography in British education. Interest in geographical education has been further stimulated by a number of journals. *Teaching Geography* was initiated by the Geographical Association to encourage teachers in schools to publish short articles about their teaching experiences so that those experiences could be shared more widely. The *Journal of Geography in Higher Education* was an attempt to stimulate a greater concern in higher education for "how" lecturers taught as well as "what" they taught.

Geography, as the official journal of the Geographical Association, covers all aspects of the subject including geographical education research. British teachers also have access to, and publish in, two American journals concerned with teaching geography, the *Journal of Geography* and the *Professional Geographer*. The Geographical Association, the organisation primarily concerned with teachers in schools, has also adopted a policy of publishing a variety of materials specifically for school teachers. This publication policy has proved highly successful due to both the usefulness of the material and its low cost. The success of the policy may also be seen as a response to the general belief that teachers at all levels rarely read journals.

The expansion in geographical education research hinted at in the earlier sections of this chapter has certainly occurred in terms of published material. What follows is an attempt to review this literature outlined above using a classification to simplify the review. However, any attempt at classification faces problems. Any classification assumes that any one article will fit into one category. This is not true. For example, Whitelegg (1981) writes about new video material and its use in classes. He compares this with "live" teaching, but although his article is concerned with both a teaching technique and with the role of teachers as researchers, it is classified only under the first heading.

2. Teaching methods

The literature review as a whole is based on a selection from over one hundred items. Nearly half of these items are concerned with teaching methods. This has always been the emphasis within past reviews. What stands out in this review is the emphasis on quantitative techniques and their application through use of a main-frame computer or micro-computer. There is also a spate of material on fieldwork. A range of old and new approaches to the use of audio-visual techniques is also evident. It is worth considering each of these separately.

a) Computer assisted learning

There is clear evidence that British geographers have adopted the computer and micro-computer and are using it effectively. Several books provide guidance including Graves (1984a), Killen (1983), Midgely and Walker (1985) and Unwin and Dawson (1985). Yoeli (1982) is specifically concerned with computer graphics and Davidson and Jones (1985) offer guidance on microcomputer cartography for undergraduate courses. The debate on the validity of statistical and mathematical techniques when applied to spatial data continues and several authors write on this topic, e.g. Selkirk (1982), Shaw and Wheeler (1985), Watson (1984) and Williams (1984).

Articles are more limited in content and are concerned to show the application of a specific technique in a particular context. Examples of contexts are shopping surveys, population data, election results and freight distributions. There are also a number of articles which offer a more general view of computing. The interest in computing has led *Teaching Geography* to introduce a regular review of ongoing activity and available resources. Articles have included those by Bowlby and Silk (1982), Barr (1983), Batty, Bracken, Guy and Spooner (1985) Johnston and Hay (1984), McKinnon (1985), Shepherd (1985) and Summerfield (1983).

b) Fieldwork

Fieldwork has been an accepted teaching method in geography teaching in Britain for many years. That it should still provide a topic for so many books and articles is therefore surprising. The reasons for this appear to be twofold. Fieldwork techniques are becoming more sophisticated and much clearer objectives are being set for specific activities with some attempt to measure their success. The second factor may be resource pressure. The British education system as a whole is being made more accountable for the resources it uses. Fieldwork clearly uses resources in terms of time and transport and so needs more justification than has been necessary in the past. There is also evidence in the secondary school system that the examination requirement for projects by individual pupils has raised interest in fieldwork data collection as the basis for projects. Books include those by Dackombe and Gardiner (1982), Ferretti and Boyce (1984), Goudie (1981a) and Lenon and Cleves (1983), while articles have been written by Blacksell (1981) Bull and Daniel (1982) Finlayson (1981), Pocock (1983) and Trudgill (1983). Trudgill provides a guide to the potential uses of Field Studies Council centres. That there should be a need for this latter article suggests fieldwork is still important as a teaching technique.

c) Audio-visual techniques

This section includes the use of film and radio, which are well established in theory, map work and a range of new approaches through video and remote sensing. While there has been a good selection of films available for geography teachers in Britain for many years, Young and Jenkins (1984) indicate a need for a more critical approach to the use of film. Catling (1984) has been involved in research into childrens' responses to maps for a number of years and the Geographical Association through their "Bibliographic Notes" series has made available the fruits of his work specifically for primary school teachers. Gray (1981) is concerned with undergraduates using large scale geomorphological maps. Video as a teaching medium and its specific use with remote sensing photography is now generally available. In many ways video simply replaces films but the remote sensing field does require teachers to learn new skills: Curran (1985), Curran and Wardley (1985), Summer (1984) and Whitelegg (1981).

d) Others

The remaining literature offers some very interesting insights on the British geographical scene. Assessment is an important part of the teaching/learning process and seeking new methods of assessment and making them generally available has been a major part of teacher development since the 1960s. Orrell and Weigand (1984) offer an overview while Guinness and Ball (1983) and Tolley (1981) offer help and materials related to data response questions. Games and simulations continue to attract attention with articles by Connolly (1981) and Walford (1981a).

Criticism of didactic teaching has led to a range of other approaches being investigated and developed. This has now reached the stage of a number of books being published, each concentrating on a specific approach. Beaumont and Williams (1983) offer guidance on project work, Hilton and Tidswell (1984) on the enquiry learning approach, Kirby and Lambert (1985) on practical work while Slater (1982) offers an interesting account of activity planning applied to school geography. An overview of the whole process of giving teachers a tool bag of varying techniques is available for primary school teachers in Mills (1981) and for the secondary school field in Graves (1980). Lecturing is given a refurbishment by Gibbs and Jenkins (1984) who suggest ways of changing the teaching process with large lecture groups.

A new approach is outlined by Cosgrove (1981) where students interview staff to gain an understanding of changes in geographical thought. There are clearly limits to the context in which this method can be used but it is worth considering in higher education teaching.

3. Curriculum perspectives

The term curriculum perspectives is used here in the sense of an overview of geography or a study of one aspect of the subject related to teaching. Overviews can be by bibliographic methods as in Corney (1982), by a collection of essays as in Boardman (1983) and Walford (1981b) or by an overall focus on the range of teaching resources as in Graves (1982). Cleverley (1985) and Dennison (1981), as presidents of the Geographical Association and practising school teachers, used their presidential addresses to review British geographical education. A very personal view is presented by Jay (1981).

A number of writers considered some aspects of the academic discipline in a teaching context. Bale (1981) pleaded for a geography of sport, Golledge (1985) commented upon behavioural geography in an American setting while Sibley (1981) looked for order in human geography.

Rather more writers were concerned with specific issues and the place of geography in interdisciplinary studies. The use of language in geography is considered in Williams (1981) and in a book edited by Williams (1981). Boardman (1983) looks at graphicacy, Hicks (1981) the multi-ethnic curriculum and Kemp (1981), mixed ability teaching. Environmental education attracts three writers in particular. Haynes (1982) looks at methods of teaching, Kelly (1984) at geography and environmental education in schools and Palmer and Wise (1984) provide an interesting insight into teaching environmental studies to mixed ability upper primary pupils.

World studies is looked at by Hicks and Townley (1982) and the general issue of integrated studies in schools is considered by Williams (1984).

There remains a group of titles which reflect the changing political position of education in Britain. How does geographical education stand in comparison with other subjects? Is it value for money spent by the state? These accountability issues drew forth a book from Massey and Allen (1984) which argues that geography is important to society. Lewis (1985) edited a publication arguing the relevance of geography and demonstrating this in terms of geography graduate careers. Corney (1985) edited another publication with a similar argument but clearly focussed upon school geography. This concern led to more specialised studies such as that of student qualifications and success in higher education by Strachan (1984), a book on the higher education and school interface in terms of updating teachers in schools by Kent (1981) and Nuttall's (1984) concern for the impact of Youth Training Schemes for the unemployed upon geography in further education colleges.

Huckle's *Geographical Education: Reflection and Action* (1983) is one of the most challenging books of the period. This collection of essays puts an emphasis upon the teaching of values in geography which makes some people feel uneasy.

4. Curriculum projects

The 1970s were rich in geography school curriculum projects. The *Geography 16-19 Project* is a continuation of that movement into the 1980s and is considered in some detail later. The projects are essentially school projects; nobody has yet developed a curriculum project in higher education though computing and computer assisted learning almost fall into this category. The projects publish their own material, much of which is in a form ready for classroom use. Given the sources used for this review, curriculum project material is sparse, because normally it is sent directly into schools.

Hart (1981) edited responses from a group of Sheffield teachers and the *Geography 16-19* team to the Mansell report. This challenged subject disciplines within the school curriculum to demonstrate the relevance of their subject content to the future employment of school leavers. Morris (1981) outlines an additional unit on medical geography for GYSL, Kapadia (1981) comments upon geography in relation to the Schools Council *Statistical Education Project* and Carter (1985) suggests how geographers in schools might become involved with the government Training and Vocational Education Initiative (T.V.E.I.).

5. Curriculum statements

This is something new. Some seven articles have appeared in *Geography* in the review period which are statements about geography in the school curriculum. They are a response to government initiatives about the curriculum and there is a growing interest in the Geographical Association in assisting teachers in schools to compile statements of aims to guide curriculum development. Three articles were specific Association statements of policy: on geography in the school curriculum (1982), geography for 5-16 year olds (1981) and geography for 16-19 year olds (1983). The recent Secretary of State for Education, Sir Keith Joseph (1985) addressed a special meeting of the Geographical Association in London in 1985 at which the Senior School Staff Inspector, Trevor Bennetts (1985) also presented a paper on criterion referencing in geography as part of the growing debate on a national school curriculum which specifies clear objectives to be achieved by certain stages. Finally, Williams and Catling (1985) prepared a statement on geography in primary education for a parliamentary committee.

The process of thinking about the geography curriculum and its aims and objectives has never had to be so explicit as in the 1980s. This is a response to government policy which has resulted in a recent government statement (1987) that geography will be included in the core curriculum for all school pupils.

6. Subject update

A mass of material is published by British academic geographers which can be considered as necessary reading for all teachers of geography who wish to update their factual knowledge. Clearly a review of this kind cannot include all such publications. What follows is simply an indication of the various sources available to geography teachers.

Many academic texts were published, one of the less usual of which was a book by Courtenay (1985) who edited a group of essays on the theme of development with the aim of encouraging teaching in this area. *Teaching Geography* ran a series of articles highlighting recent academic developments including those by Goudie (1981b) on mechanical weathering of rocks and Sandford (1983) on criteria for selecting atlases. The Geographical Association published a series entitled *Bibliographic*

Notes which provided an updated set of references on specific topics. In the review period these include Bennison and Raw (1983) on urban geography and Dickenson and Povall (1984) on Brazil. The Association also produced a publication on the 1981 census and possible ways of using this data by Champion (1983).

A further source of update is American journals. British geographers do publish in journals of other countries with English language editions and the *Professional Geographer* has frequent contributions from Britain. Hamilton (1981) wrote about multinational companies, Pacione (1983) about perception studies in an urban neighbourhood setting and Pepper and Jenkins (1984) suggested changes in political geographic thinking resulting from the possibility of nuclear war.

7. Teachers as researchers

The action research curriculum model outlined above assumes that teachers will become researchers. As part of their professional teaching role, geography teachers should become part of the geographical education research process as both practitioners and researchers. If this is true then there should be some evidence of this in the literature.

This particular review produced some sixteen items which represent teachers as researchers. Four are by school teachers. Glendinning and Pearson (1983) report on using air photographs with 6-11 year olds, Matthews (1984) looked for gender differences in awareness of place and space in pupils from 6-11 years of age and Walton (1984) looked at international stereotyping in 10-17 year olds. Shaw (1984) reports on four years of teaching 11-13 year olds with learning difficulties although his article is a reflective rather than an evaluative statement.

This rather sparse gleaning from school teachers offers some contrast with the impact of the *Journal of Geography in Higher Education*. Some six articles appeared during the review period indicating a number of small-scale experiments being conducted in a professional, if random, way. There is an evaluation of the skills resulting from student project work (Silk and Bowlby, 1981), an evaluation of four years of students using a self learning package (Clarke and Gregory, 1982), an evaluation of a course with an emphasis on the use of film (Jenkings and Young, 1983) and a study of presenting a library-users course either as a separate module or as an integral part of a geography course (Mayfield 1985).

A number of articles with a research perspective are about fieldwork, which also appears as a major topic in the teaching methods section above. Harrison and Luithlen (1983) evaluate six years of land use fieldwork with students and Keene (1982) discusses the impact of providing students with a self-paced exercise package for field classes instead of lecturer expositions on the sites. In an article about Dutch experience in field work, Ashworth (1983) compares data collected by students in the field with published data in an attempt to assess the value of the fieldwork. Cho (1982) writes about the use of a workbook to help students in spatial data analysis in Australia. Hill and Helburn (1981) report on a ten-year experiment in peer group teaching in human geography in the United States and Wilson and Widt (1982) report on an Australian exercise with fourteen year olds on perception of desert landscapes.

In book form, Graves (1984b) presents a statement on research methods and Bell (1981) reports on a range of undergraduate projects in education which provide a stimulus for further work.

Case study: the *Geography 16-19 Project* in Sheffield

1. Background

Geographical education research is about improving the quality of geography teaching within the education system. It is not an esoteric exercise. Rather, its success must be measured by the extent to which it helps all geography teachers improve the quality of their teaching. The action research curriculum model (Figure 43.1) attempts to show how the results of research are taken by teachers and incorporated into or rejected from their teaching.

Action research and curriculum development in geographical education are well established activities in the City of Sheffield. Involvement with the growth and development of GYSL from its inception and close liaison between the Local Education Advisory Service and staff from the Department of Geography and Environmental Studies of Sheffield City Polytechnic formed the foundation for the establishment of the unique Centre for Geography and Environmental Studies, funded jointly by Sheffield City Polytechnic, Sheffield LEA and the Schools Council. This building, with secretarial support staff, was the focus for initial, postgraduate and in-service training and also the national centre for the GYSL project.

The challenges of the new style of geographical teaching and learning of the 1970s, largely associated with GYSL, invigorated and inspired teachers at all levels. Many local teachers were also extending their appreciation of the curriculum process by taking the two year part-time course leading to the CNAA diploma in curriculum planning in geography offered as part of the in-service programme of the Department of Geography and Environmental Studies at Sheffield City Polytechnic. The scene was set for the take-up of the *16-19 Geography* in Sheffield in the 1980s.

One of the project's aims is "to involve teachers in re-considering geographical objectives and, by means of this involvement, to help them to appreciate their role as curriculum developers". (Hart, 1984). This aim was certainly a central focus when initial discussion took place in 1979 between Michael Naish of the central project team, Trevor Higginbottom, who was General Adviser for Humanities and Multicultural education with Sheffield LEA, and Elspeth Fyfe, Senior Lecturer in Geography at Sheffield City Polytechnic. An alternative to the traditional Advanced Level public examination course was an attractive proposition and Trevor Higginbottom's enthusiasm and practical support for teachers willing to embark on the *16-19 Geography* "A" level were outstanding.

2. Methodology

The Project is now well documented. A paper was presented at the IGU Commission on Geographical Education Symposium held in London in 1978 reviewing the work of the Project, (Naish, Kent and Rawling, 1978). The recently published book, *The Contribution of a Curriculum Project to 16-19 Education*, details the growth and development of the project nationally (Naish, Rawling and Hart, 1987).

Sheffield is a large industrial city with education in the secondary phase organised into comprehensive schools varying in size from one-thousand to two-thousand pupils. Education after the age of sixteen is voluntary and curricula for such senior pupils are organised to provide both academic and vocational opportunities.

The Project was introduced to the Sheffield area and curriculum development proceeded in eight stages.

a) Stage 1

Initially, five schools and eleven teachers, with Elspeth Fyfe as co-ordinator, were involved. A conscious effort was made to gain a strong support network from the outset. The eleven geography teachers were cautiously enthusiastic and it was important to discuss the whole issue with headteachers and their deputies whose main responsibility is curriculum affairs. The major questions which were raised were related to examinations and costs. What would be the "currency" of the new "A" level for entry to higher and further education and to employment? What would be the resource implications for the changed style of teaching and learning? Satisfactory answers were obviously provided since headteachers gave their approval and wholehearted support for the venture.

b) Stage 2

Members of the Sheffield Group of teachers were conscious that they had joined the Project's pilot stage some three years after its inception and therefore a sense of urgency pervaded the meetings. There were only a few months to prepare for the first sixth-formers whose two year "A" level programme would culminate in examinations in June 1982. There is no doubt that a very special relationship developed within the group. Discussions were lively, differing view points were challenged vigorously and each member of the group took a full and active part. The range of experience was wide but the levels of tolerance and hardwork were equally high. Collaboration was the key-note. There were specific areas to explore, notably

i) People-land relationships
ii) Enquiry-based learning
iii) Resource preparation
iv) Choice of option modules
v) Sequencing of modules
vi) Coherence within a programme
vii) Assessment exercises
viii) Examinations
ix) Administrative procedures
x) Fieldwork
xi) Pupil's individual study titles and methodologies.

At times we were daunted by the size of the task. Re-orientating so radically whilst teaching full-time demands much energy, dedication and tenacity. There was also a sense of pride within the group. We had committed ourselves to the task and were determined to achieve high standards.

c) Stage 3

A programme of meetings was arranged in order to discuss pressing needs. The effect of the whole experience for the teachers involved was to challenge and sharpen their own critical awareness. For each there was the need to re-assess long-held views, to explore different methods of approach and to arrive at consensus. Two early and crucial decisions involved the choice of option modules and the order in which the core and option modules were to be taught. After long discussion it was agreed to have a common programme throughout the schools, three of which worked as a consortium. Relevance of issues to our particular sixth-formers, as well as their justification in terms of people-environment relationships, led to the conclusion that it was through careful selection of the option modules that we would gain coherence in the course. "Global Limits to Growth" was seen as the pivotal module to which all the others could be related. Through this course students would be provided with a world overview of the central issues surrounding people, resources and the environment.

Again after much discussion it was decided to choose "Man's Response to Difficult Environments" partly because it continued the theme of interaction within natural systems, but also because it could include a strong emphasis on physical geography which we felt to be very necessary to achieve balance in the programme. Much debate had taken place locally for a number of years on the neglect of this aspect of the subject in many school curricula based on Schools Council projects.

The third option module chosen was "Alternative Approaches to Development" where an emphasis could be placed on themes relating to Developing countries, and, through selected case studies, planning alternatives could be explored in relation to some of the issues outlined earlier in the course. It became evident that through this rational selection of Option modules, a sequence for the two year course was evolving (See Figure 43.2). Practical considerations of teacher availability and expertise, as well as timetabling arrangements within a variety of school structures, suggested that an attempt should be made to run parallel courses which would have either a "human" or a "physical" bias. It was essential that a basic timetable be agreed since collaborative planning and preparation was to take place as the course

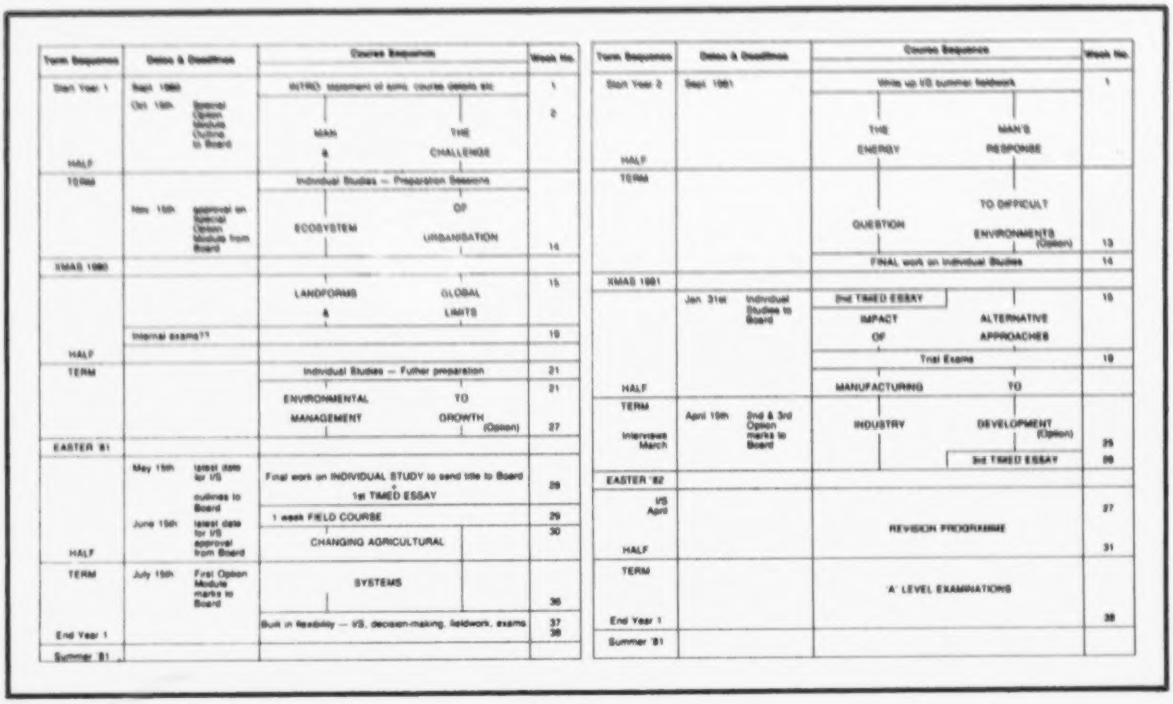


Figure 43.2 The Sheffield Group's course sequence 1980-82

proceeded. The teachers were aware that 16-19 Geography provided them with a welcome freedom of choice, but that this freedom was not without heavy responsibilities. Clarity of objectives, careful timing and organisation were crucial.

d) Stage 4

The place and form of fieldwork were important considerations. For a number of years there has been much thought given to these issues and two teachers in the Group had published their findings suggesting that locally there had already been an evolutionary change in approach (See Figure 43.3). The residential field week was particularly seen as equipping students with skills and attitudes to enable them to cope more effectively with the demands of the Individual Study. Some traditional fieldwork approaches were abandoned, some were re-orientated with new exercises and new locations were suggested.

e) Stage 5

The Individual Study was seen as a most important exercise for students and much thought was given to manageable topics which would enable them to fulfill the requirements. After five years, teachers are conscious of the limited variation possible on themes relevant to sixth-formers in the locality and the problem of overlap. Nevertheless they are most enthusiastic about the educational value of this form of activity/assessment despite the enormous demands for individual tutorial time it makes.

f) Stage 6

The *16-19 Geography Project* lends itself to the application of computer assisted learning by both providing programs which enable an enquiry-based approach to be developed and by allowing students to handle otherwise impractical quantities of data. One of the teachers from the Sheffield Group became a member of the Schools Council Working Party which was established to develop computer programs suitable for project courses.

g) Stage 7

The Sheffield Group of teachers was acutely aware of the need for resources for use in the classroom but deliberately set itself the task of familiarising itself with the basic philosophy of the course and discussing the practicalities of teaching to these objectives before admitting to a desperate need for materials. Trial materials were sent from Central Project Headquarters. Having entered late into the Project, the Group expected to be able to rely on these initially. However, the experience of the Sheffield team in curriculum development in geography led them to adopt a very critical approach to the materials. It was decided that we should write our own materials but that because of lack of time and a limited budget, we would concurrently have to adapt the supplied materials for classroom use. Publications from the Project were in the future and we were anxious to enable those pupils taking the first two cycles of examinations to achieve the best possible results. Pupils were enthusiastic about the course and it was important for the success of the venture that the new course did not disadvantage the pupils. Great

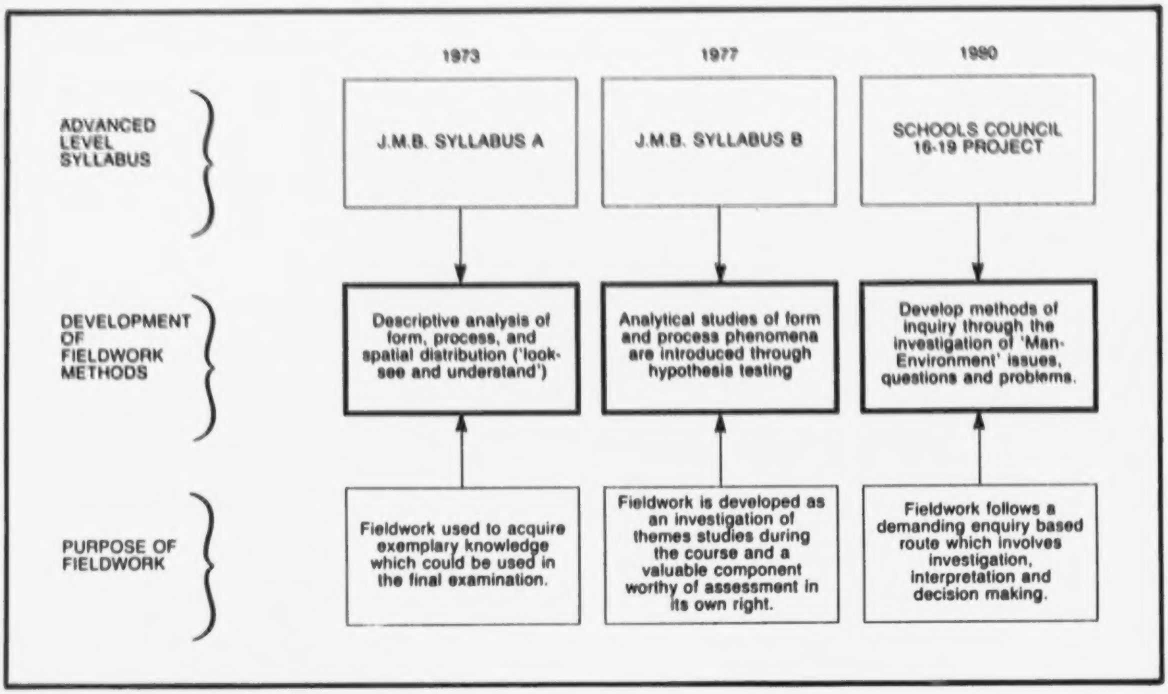

1973
1977
1980
ADVANCED LEVEL SYLLABUS
J.M.B. SYLLABUS A
J.M.B. SYLLABUS B
SCHOOLS COUNCIL 16-19 PROJECT
DEVELOPMENT OF FIELDWORK METHODS
Descriptive analysis of form, process, and spatial distribution ('look-see and understand')
Analytical studies of form and process phenomena are introduced through hypothesis testing
Develop methods of inquiry through the investigation of 'Man-Environment' issues, questions and problems.
PURPOSE OF FIELDWORK
Fieldwork used to acquire exemplary knowledge which could be used in the final examination.
Fieldwork is developed as an investigation of themes studies during the course and a valuable component worthy of assessment in its own right.
Fieldwork follows a demanding enquiry based route which involves investigation, interpretation and decision making.

Figure 43.3 Changing approaches to fieldwork

efforts were made to get the resource base right. With the co-operation of Resource Units in schools and the Print Unit of the Polytechnic, the Group produced its own resource books and materials for the Option modules and some of the Core. This activity was costly and time consuming but an enormous amount was gained from the research and practical experience of production.

h) Stage 8

The most enticing feature of *16-19 Geography* to the Sheffield teachers had been the fact that the assessment procedures clearly matched the aims of the course. Internal continuous assessment by means of essays, skills-based practical exercises and the Individual Study, together with two formal examinations contributed to the final grade awarded to a student. That one of the examinations was to be a decision-making exercise was welcomed enthusiastically. Much fruitful discussion revolved around devising exercises and phrasing essay titles as well as apportioning marks. Local cross-moderation between teachers was made.

3. Methods of working

Meetings were held under the leadership of the local co-ordinator at about ten day intervals. Liaison with staff of schools, pupils and parents was felt to be crucial. As well as a public relations exercise, it was useful in clarifying ideas and procedures. Information about the Project and the way it was being implemented was produced as a booklet for circulation. A leaflet for the sixth-formers was printed, detailing the main features of the course, its philosophy and examination procedures. At a time of competition for dwindling resources it was crucial to publicise the progress of this particular curriculum innovation. With co-operation from the LEA, headteachers and the Polytechnic, one and two day workshops for teachers were held in the Department of Geography and Environmental Studies. In order to widen the social and educational experience of the sixth-formers, a one-day conference with lectures and workshops has continued to be held each year at the Polytechnic.

It has proved useful for schools to undertake collaborative fieldwork. Again this has broadened the experience of the students and often resulted in economies being made.

Small groups of teachers agree to prepare resources and drafts of assessments which are then discussed by the whole group before being processed.

Formal and informal discussions with examiners have been useful in allowing teachers to re-shape and develop their approach to the course and its content. Discussions with the Chief Examiner have similarly stimulated reflection and action.

Though concern for the "A" level course was paramount, Sheffield teachers also valued the scope the project offered for other students. A small group pioneered a one year course based on the project for the Certificate in Extended Education (CEE). A one day seminar with Clive Hart of the Central Project Team resulted in the publication in March 1981 of a booklet which detailed ideas relating to the contribution of geographical education to 1+ pre-employment courses based on the Mansell Report: *A Basis for Choice*.

The activities discussed thus far have been undertaken in addition to the heavy teaching commitments of the people concerned: busy people finding time to be even busier. When an opportunity arose in 1986 for a Teacher Fellowship of one term's secondment to be held at Sheffield City Polytechnic it was felt that another stage had been reached. There was pleasure at the recognition of the need for practising school teachers to spend a consolidated period of time away from the classroom and be able to concentrate on research into *16-19 Geography*. One of the requirements of the funding was that the work undertaken should be directly relevant to a current classroom situation and capable of being disseminated to other teachers in the local area. Jane Ferretti of King Edward VII Comprehensive School was awarded the Fellowship. During the fourteen weeks spent at the Polytechnic she was able to reflect on her own experiences of teaching *16-19 Geography* and those of her colleagues. She was keen to develop materials which could be used in teaching the core modules. This area takes up most of the teaching time, forms the basis of the formal examinations and has largely been neglected by publications. Preparing materials which are up-to-date, varied and which encourage pupil-centred activities within an enquiry-based framework is a very time consuming job. Initially thought focussed on two core modules, "The Impact of Manufacturing" and "The Challenge of Urbanisation". Both had particular local relevance to Sheffield. After preliminary work, it was decided to concentrate, in the time available, on producing the first title as a resource pack. This was designed to provide a route to enquiry through the particular syllabus by covering five sections as indicated in Figure 43.4.

Three sets of slides have been compiled to support units on Corby (B7), Industrial Change in the Lower Don Valley, Sheffield (C1 & C2) and Industrial Pollution (D1). Questions and exercises have been devised which require students to understand the material, to think about the issues involved and to avoid those tasks which merely require distillation of the information provided. The resource packs are currently being prepared for publication by Sheffield LEA Resources Unit. Materials will be arranged in a loose-leaf binder so that relevant master sheets can be extracted and copied in individual schools. Slide sets will be included. The dissemination of the materials is crucial to the ultimate success of the endeavour. All comprehensive schools in Sheffield will receive a copy of the resources and some further copies will be available. Distribution will be followed by a series of seminars at which teachers will discuss with the author the contents of the packages, methods of using the materials and the updating and modifications that will become necessary.

4. Reflections

Teachers are convinced of the overall success of this curriculum innovation. Currently fifteen schools are following the programme including some of the comprehensive schools which have a large number of "A" level geography entrants and a tradition of a high success rate. Pupil reaction to the course is good. There is apparent enjoyment and pleasure at the contemporary relevance of the work. There have been problems with students feeling overwhelmed by the number of handouts being supplied. Initially, too, students felt insecure because they had so few notes from which to "revise". However, as the new course became more established in individual schools and teachers became more aware of problems and possibilities, these concerns evaporated. Teachers have reported that more pupils have applied to study geography in higher education and the subject has become an even more popular "A" level choice. Collaboration between departments within schools is evident. Pupils seek advice from staff in biology, chemistry and mathematics departments when topics in their Individual Studies demand skills not normally taught as part of the geography course. In a number of instances the philosophy and methodologies of 16-19 Geography have acted as a stimulus for new approaches to curriculum design in other subject areas. Geography has once again been in the forefront of curriculum innovation. Curriculum development is largely about developing people, not simply our students but also ourselves. Close collaboration of teachers in a co-operative venture has brought confidence, support and security. Many of the fears and suspicions of 1980 were dissipated by 1985. There is still much to do as a large proportion of the city will be served by Tertiary Colleges from 1987. The scope is immense. Measuring "A" level examination successes is still very important for pupils, parents and teachers. We were very pleased with the "A" level examination grades achieved by the first intake of students. The Group decided to defer comparisons and analysis of trends for at least five years, until 1987. There is confidence that, not only in these measurable terms but also in the whole educational experience, pupils and teachers will have gained much from the introduction of *16-19 Geography* in Sheffield.

Clarifying values and attitudes, understanding policies and fostering an ability to predict rationally the effects of environmental interactions are worthwhile outcomes of this curriculum change; not only is geography taught but personal and social development are fostered. The participatory system demanded by *16-19 Geography* involves teachers as innovators continuously re-appraising the curriculum and being sensitive to the requirements of a changing world.

REFERENCES

Ashworth, G.J. (1983) "The Use of Data Collection Exercises in Field Courses", *Journal of Geography in Higher Education*, 7 (2) 141-149.

Bale, J.R. (1981) "Geography, Sport and Geographical Education", *Geography*, 66 (291) 104-115.

Barr, R. (1983) "Teaching Geography Computer Page", *Teaching Geography*, 9 (2) 88-91.

Batty, Bracken, Guy, & Spooner (1985) "Teaching Spatial Modelling Using Interacting Computers and Interactive Computer Graphics", *Journal of Geography in Higher Education*, 9 (1) 25-36.

Beaumont, J.R. and Williams, S.W. (1983) *Project work in the geography curriculum: an advanced level primer*, London, Croom Helm.

Section A: **An Introduction to Manufacturing Industry**

A1 Manufacturing Industry as a system.
A2 Employment trends in the United Kingdom 1951-1981.
A3 Britain's industrial regions.
A4 Britain's textile industry.
A5 The steel industry in Britain.
A6 The growth of the electronics industry in Britain and USA.
A7 The changing structure of manufacturing industry in Britain.
A8 The urban-rural manufacturing shift.

Section B: **Regional Problems and Policies**

B1 Regional problems in Western Europe.
B2 Regional unemployment in Britain.
B3 Regional policy in Britain
B4 What influences the location of high-tech industries?
B5 North:South contrasts in Britain.
B6 The Coronet Brush Company. Role play.
B7 Corby. A case study.
B8 The Myrdal Model of Cumulative Causation.

Section C: **Industrial Change in Sheffield**

C1 Industry in the Lower Don Valley.
C2 Fieldwork exercise. Changes in the Lower Don Valley.
C3 The social, economic and environmental impact of industrial decline on the Lower Don Valley.
C4 Sheffield City Council's Plans for the Lower Don Valley.
C5 The Meadowhall Development.

Section D: **Industrial Pollution**

D1 Industrial pollution.
D2 The Lower Swansea Valley.
D3 I.C.I. Teesside.
D4 Industrial pollution in developed and less developed countries.

Section E: **Industrial Development in the Third World**

E1 Brazil. A case study.

Figure 43.4 The Contents of the Unit on "The Impact of Manufacturing Industry"

Bell, P.G.E. (1981) *Experiments in the teaching and learning of geography*, Leeds, University of Leeds, School of Education.

Bennetts, T. (1985) "Geography From 5-16: A View From the Inspectorate", *Geography*, 70 (309) 299-314.

Blackwell, M. (1981) Analysing Land-Use Change: Some Thoughts on Possible Directions for Fieldwork in Human Geography, *Geography*, 66 (291) 116-123.

Boardman, D. (1983) *Graphicacy and geography teaching*, London, Croom Helm.

Boardman, D. (1985) *New directions in geographical education*, London, Falmer Press.

Bowlby, S., & Silk, J. (1982) "Analysis of Qualitative Data Using GLIM", *Professional Geographer*, 34 (1) 80-89.

Carter, R. (1985) TVEI: "A Place for Geography", *Teaching Geography*, 10 (2) 51-2.

Cho, G. (1982) "Experiences With a Workbook for Spatial Data Analysis", *Journal of Geography in Higher Education*, 6 (2) 133-40.

Clarke, M.J. & Gregory, K.J. (1982) "Physical Geography Techniques: a Self-Paced University Course", *Journal of Geography in Higher Education*, 6 (2) 123-131.

Cleverley, P. (1985) "Classroom Hot Spots Change Again", *Geography*, 70 (308) 206-211.

Coates, B.E. and Williams, M. (1984) "Expenditure Cuts and Geography Teaching in Secondary Schools: Results of a Questionnaire", *Geography*, 69 (303) 136-138.

Connolly, G. (1981) "The Use of 4 Selected Games in a Tertiary Geography Programme", *Journal of Geography in Higher Education*, 5 (2) 121-132.

Cosgrove, D., (1981) "Teaching Geographical Thought Through Student Interviews", *Journal of Geography in Higher Education*, 5 (1) 19-22.

Courtenay, P.P. (ed.) (1985) *Geographical studies of development*, Harlow, Longman.

Curran, P.J. (1985) *Principles of remote sensing*, Harlow, Longman.

Curran, P. & Wardley, N. (1985) "Remote Sensing in Secondary School Geography: the Place of Handset MSS", *Geography*, 70 (308) 237-240.

Dackombe, R.V. and Gardiner, V. (1982) *Geomorphological field manual*, London, George Allen and Unwin.

Davidson, N. & Jones, P. (1985) "Mapping with Micros: Teaching Introductory Computer Cartography", *Journal of Geography in Higher Education*, 9 (2) 147-155.

Dennison, V.D. (1981) The Use of Geography, *Geography*, 66(293) 263-276.

Ferretti, J. and Boyce, J. (1984) *Fieldwork in geography*, Cambridge.

Fink, J.D. (1985) "First Year on the Faculty: the Quality of Teaching", *Journal of Geography in Higher Education*, 9 (2) 129-145.

Finlayson, B. (1981) "Analysis of Stream Suspended Loads as a Geomorphological Teaching Exercise", *Journal of Geography in Higher Education*, 5 (1) 23-35.

Geographical Association (1981) "Geography in the School Curriculum 5-16", *Geography*, 66 (292) 179-180.

Geographical Association (1982) "Recent Involvement of the GA in Curriculum Debate", *Geography*, 67 (294) 71-75.

Geographical Association (1983) "Geography in the Curriculum 16-19", *Geography*, 68 (299) 149-163.

Gerber, R. (1981) "Young Childrens' Understanding of the Elements of Maps", *Teaching Geography*, 6 (3) 128-133.

Gibbs, G. & Jenkins, A. (1984) "Breaking Up Your Lecturers: or Christaller Sliced Up", *Journal of Geography in Higher Education*, 8 (1) 27-39.

Glendinning, H. and Pearson, M. (1983) "Using Air Photographs with Young Children", *Teaching Geography*, 9 (1) 3-4.

Golledge, R. (1985) "Teaching Behavioural Geography", *Journal of Geography in Higher Education*, 9 (2) 111-127.

Goudie, A. (ed.) (1981a) *Geomorphological techniques*, London, George Allen & Unwin.

Goudie, A. (1981b) "The Disintegration of Rocks by Mechanical Processes", *Teaching Geography*, 6 (4) 176-9.

Graves, N.J. (1982) *New UNESCO source book for geography teaching*, Harlow, Longman.

Graves, N. (ed.) (1984a) *Computer assisted learning in geographical education*, London, University of London Institute of Education.

Graves, N. (ed.) (1984b) *Research and research methods in geographical education*, London, University of London Institute of Education.

Gray, M. (1981) "Large Scale Geomorphological Field Mapping: Teaching the First Stage", *Journal of Geography in Higher Education*, 5 (1) 37-44.

Guinness, P. and Hall, K. (1983) *Data response questions in advanced level geography: physical geography*, London, Hodder and Stoughton.

Haines-Young, R.H. (1983) "Nutrient Cycling and Problem Solving: a Simple Teaching Model", *Journal of Geography in Higher Education*, 7 (2) 125-139.

Hamilton, F.E.I. (1981) "Industrial Systems: a Dynamic Force Behind International Trade", *Professional Geographer*, 33 (1) 26-35.

Hammond, R. (1982) "Linear regression and curvilinear trend-lines", *Geography*, 67 (295) 126-133.

Harrison, C. & Luithlen, L. (1983) "Fieldwork for Land Use Students: An Appraisal", *Journal of Geography in Higher Education*, 7 (1) 23-32.

Hart, C.R. (ed.) (1981) *A basis for choice?* London, Schools Council with Sheffield LEA.

Haynes, R. (ed.) (1982) *Environmental science methods*, London, Chapman and Hall.

Hicks, D.W. (1981) *Minorities: a teacher's resource book for the multi-ethnic curriculum*, London, Heinemann Educational.

Hicks, D. and Townley, C. (1982) *Teaching world studies: an introduction to global perspectives in the curriculum*, Harlow, Longman.

Hill, A.D. and Helburn, N. (1981) "Two Modes of Peer Teaching in Introductory College Geography", *Journal of Geography in Higher Education*, 5 (2) 145-154.

Hilton, K. and Tidswell, V. (1984) *Enquiry in geography*, London, University Tutorial Press.

Huckle, J. (ed) (1983) *Geographical education: reflection and action*, Oxford, Oxford University Press.

Jay, L.J. (1981) *Geography teaching with a little latitude*, London, George Allen and Unwin.

Jenkins, A. & Young, M. (1983) "Geographical Education and Film: an Experimental Course", *Journal of Geography in Higher Education*, 7 (1) 33-44.

Johnston, R.J. & Hay, A.M. (1984) "The Geography of Ticket Splitting", *Professional Geographer*, 36 (2) 201-206.

Jones, M. (1981) "Putting Geography on the Air", *Teaching Geography*, 7 (1) 23-31.

Joseph, Sir Keith (1985) "Geography in the School Curriculum", *Geography*, 70 (309) 290-297.

Kapadia, R. (1981) "Statistics for Geographers", *Teaching Geography*, 6 (4) 161-2.

Keene, P. (1982) "Examination of Exposures of Pleistocene Sediments in the Field: a Self-Paced Exercise", *Journal of Geography in Higher Education*, 6 (2) 109-121.

Kelly, V. (1984) "Geography and Environmental Education in Schools", *Geography*, 69 (303) 138-140.

Kemp, R. (1981) "Teaching Strategies for Mixed Ability", *Teaching Geography*, 7 (2) 58-59.

Kent, A. (ed.) (1981) *Recent university work in geography and its relation to schools*, London, University of London Institute of Education, Department of Geography.

Killen, J. (1983) *Mathematical programming methods for geographers and planners*, London, Croom Helm.

Kirby, A. and Lambert, D. (1985) *Practical approaches*, London, Longman.

Knowles, R. and Stowe, P.W.E. (1982) *Western Europe in maps: topographical map studies*, Harlow, Longman.

Lenon, B.J. and Cleves, P.G. (1983) *Techniques and fieldwork in geography*, London, University Tutorial Press.

McKinnon, A.C. (1985) "Demonstrating the Use of Spatial Optimising Techniques by Means of a Freight Distribution Game", *Journal of Geography in Higher Education*, 8 (2) 151-157.

Massey, D. and Allen, J. (1984) *Geography matters: a reader*, Cambridge, Cambridge University Press.

Matthews, M.H. (1984) "Cognitive Mapping Abilities of Young Boys and Girls", *Geography*, 69 (305) 327-336.

Mayfield, I. (1985) "The Limits of Library User Education: Arguments for a Lecturer-Led, Student-Centred Approach", *Journal of Geography in Higher Education*, 9 (2) 157-164.

Midgley, H. and Walker, D. (1985) *Microcomputer in geography teaching*, London, Hutchinson.

Morris, J. (1981) "Medical Geography: A Man and Environment Approach", *Teaching Geography*, 7 (1) 5-9.

Nuttall, S.E. (1984) "New Courses in Further Education: the Geographers Contribution", *Geography*, 69 (304) 244-249.

Pacione, M. (1983) "Temporal Stability of Perceived Neighbourhood Areas in Glasgow", *Professional Geographer*, 35 (1) 66-72.

Pepper, D. and Jenkins, A. (1984) "Reversing the Nuclear Arms Race", *Professional Geographer*, 36 (4) 419-427.

Pocock, D.C.D. (1983) "Geographical Fieldwork: an Experiential Perspective", *Geography*, 68 (301) 319-325.

Proctor, N. (1984) "Geography and the Common Curriculum", *Geography*, 69 (302) 38-45.

Sandford, B. (1983) "Criteria for Selecting a School Atlas", *Teaching Geography*, 8 (3) 107-9.

Selkirk, K.E. (1982) *Pattern and place: an introduction to the mathematics of geography*, Cambridge, Cambridge University Press.

Shaw, F. (1984) "Teaching Geography to Children With Moderate Learning difficulties", *Teaching Geography*, 9 (4) 162-3.

Shaw, G. and Wheller, D. (1985) *Statistical techniques in geographical analysis*, Chichester, John Wiley.

Shepherd, I.D.H. (1985) "Teaching Geography with the Computer: Possibilities and Problems", *Journal of Geography in Higher Education*, 9 (1) 3-23

Sibley, D. (1981) "Notion of Order in Spatial Analysis", *Professional Geographer*, 33 (1) 1-4.

Silk, J. & Bowlby, S. (1981) "Use of Project Work in Undergraduate Geography Teaching", *Journal of Geography in Higher Education*, 5 (2) 155-162.

Slater, F. (1982) *Learning through geography: an introduction to activity planning*, London, Heinemann Educational.

Spencer, D. & Hebden, R.E. (1982) *Teaching and Learning in Geography in Higher Education*, Geo Abstracts, Norwich.

Strachan, A. (1984) "Bridging the Gap Between School and College: Evidence from the University of Leicester 1978-82", *Journal of Geography in Higher Education*, 8 (2) 125-135.

Summer, G. (1984) "Video Kills the Lecturing Star: New Technologies and the Teaching of Meterorology", *Journal of Geography in Higher Education*, 8 (2) 115-124.

Summerfield, M.A. (1983) "Population, Samples and Statistical Inference in Geography", *Professional Geographer*, 35 (2) 143-148.

Tolley, H. et al. (1981) *Data response exercises on North America and Western Europe*, Oxford, Oxford University Press.

Trudgill, S. (1983) "Field Teaching at Field Studies Council Centres", *Teaching Geography*, 8 (4) 175-6.

Unwin, D.J. and Dawson, J.A. (1985) *Computer programming for geographers*, Harlow, Longman.

Walford, R. (1981a) "Geography Games and Simulations: Learning Through Experience", Journal of *Geography in Higher Education*, 5 (2). 113-119.

Walford, R. (ed.) (1981b) *Signposts for geography teaching: papers from the Charney Manor conference*, 1980, Harlow, Longman.

Walton, M. (1984) "The Influence of the World Cup on International Stereotypes", *Teaching Geography*, 9 (5) 203.

Watson, D. (1984) *Exploring geography with microcomputers*, London, Council for Educational Technology.

Whitelegg, J. (1981) "Use of Self-Produced Video Material in First Year Undergraduate Practical Classes", *Journal of Geography in Higher Education*, 6 (2) 21-27.

Williams, M. (ed.) (1981) *Geography: language teaching and learning*, London, Ward Lock Eductional.

Williams, M. & Catling, S. (1985) "Geography in Primary Education", *Geography*, 70 (308) 243-5.

Williams, R.B.G. (1984) *Introduction to statistics for geographers and earth scientists*, London, Macmillan.

Wilson, P. & Widt, L. (1982) "How Do 14 Year Old Pupils 'See' Desert Landscapes?" *Teaching Geography*, 8 (1) 9-12.

Yoeli, P. (1982) *Cartographic drawing with computers, Nottingham*, University of Nottingham, Department of Geography.

Young, M. & Jenkins, A. (1984) "Shell-shocked: Critical Film Analysis and Teaching Strategies", *Geography*: 69 (302) 46-53.

44: RESEARCH IN GEOGRAPHICAL EDUCATION IN NIGERIA FROM 1981-1986

Julie Okpala

Most of the research on Nigerian Education has been conducted for higher degree projects. Extensive use of the results of these studies is hampered by lack of technological support, documentation and problems of communication in this vast country (area = 913,072 sq.km.) in which there are 13 traditional Federal Universities. Personal consultation in the libraries is possible but is an onerous task due to problems of funding and transport. Inter-library loans are also difficult. Each university is therefore just an island carrying out research in its own locality while the available materials are utilized mostly by its own subsequent research students. Although various research associations are at present trying to compile abstracts of research studies in higher degrees in Education from various universities, this is not yet available.

In addition to the problem of isolation, geographical education also suffers from a shortage of researchers. Geographical Education as such is not offered as a higher degree course in any of the universities in Nigeria. Only a few graduates in Education and Geography who choose to specialise in *Measurement and Evaluation* or *Curriculum* for their higher degree undertake research topics which relate directly to geographical education. For these two reasons, this paper can only report selected research studies related to geographical education from 1981-1986.

The various research studies may be classified under three major headings: Assessment and Performance, Attitude and Interests, and Techniques of Teaching and Teaching Materials. Researchers' interests and topics are not as wide as those reported by Naish (1972). New interests in terms of content and analysis focus on experimental study, observation of a number of variables and an increased use of statistical analysis.

1. Assessment and performance

Poor performance in geography in School Certificate examinations has been the concern of many Nigerian geographers. Hence, the need for improving performances forms the rational for most studies in geographical education (Okpala, 1982; Osakwe, 1982; Onasanya, 1982; Onasanya, 1985; Nwagu 1985). Okpala (1983) reported that over 50% of school certificate geography candidates in Anambra State between 1976-1981 failed. Onasanya (1985) found out that from 1977 to 1981 65% of students who sat West African School Certificate Geography in 13 schools in Ogun State failed while only 13.94% scored credit grades and above. Nwagu (1985) referred to the *Annual Reports on West African School Certificate Examinations* in Nigeria in which 47.14 percent of 74,983 candidates who sat for Geography in May/June 1975 examinations passed at credit level while in 1979 the percentage deteriorated to 18.1. Some studies which specifically investigated performance in geography as well as possible reasons for the poor performances are reported below.

Oluyeba (1981) investigated the trend in performance of students in Geography in school certificate examinations between 1976 and 1980. He collected the grades of students in school certificate examinations 1976-1980 in 10 sampled schools in Ondo State and administered questionnaires to teachers in order to elicit reasons for poor performance. He found out that less than 50% of the candidates scored between Grades 1 and 6, and that the results deteriorated from 77.4% success rate in 1977 to only 27.7 in 1980. He attributed poor performance to shortage of qualified teachers, lack of essential materials, perpetual use of lecture methods and note copying with little practical work, and the lack of time devoted to the teaching of geography in schools.

He suggested, among other things, that quality and quantity of teachers should be improved, teachers should provide adequate and suitable instructional materials and that the content of geography should be re-examined.

Uwaya (1985) investigated factors influencing students' performance in geography. The two factors investigated were students' attitude towards the subject and the availability and adequacy of instructional materials for teaching and learning geography in schools. Questionnaires were administered to a sample of 200 students and 30 geography teachers from 10 secondary schools. Results indicated fairly positive attitudes towards geography although female students were moderately more favourably disposed to geography than male students. Students and teachers regarded mapwork and physical geography as the most difficult areas and both groups considered the geography syllabus too wide.

Studies on performance and assessment are limited and most researchers concentrate on investigating the causes of poor performances through administering questionnaires to teachers. A study which differed from this attitudinal approach was a validity study (Nwagu, 1985). This study was spurred by the role of terminal evaluation which has been assigned to teachers in the new National Policy on Education (Federal Republic of

Nigeria, 1981). This is an innovation in Nigerian education in which, through the process of continuous assessment, the grade awarded in class examinations contributes to the final examination. Nwagu argued that it becomes necessary that tests items prepared by teachers should be of high quality. This study aimed at investigating the extent to which teacher-made geography tests prepared in selected secondary schools in Nigeria are valid in content. It also ascertained the relationship between academic qualifications, professional training and teaching experiences of the teachers with the quality of teacher-made tests they prepared.

Teacher-made questions asked in classes 3 and 4 in 15 secondary schools in Enugu zone in Anambra State were analysed using Bloom's *Taxonomy of Educational Objectives in the Cognitive Domain*. Results obtained showed significant differences between the number of questions requiring higher and lower cognitive processes. There was over-emphasis on recall with 77% of the questions at the lower cognitive levels. No significant relationship was found between the quality of the teacher-made tests and the qualification, professional training and the number of years of teaching experience of the teachers who set the tests.

2. Attitude and interest

Studies on attitude to geography have been made by Akande (1982) and Osakwe (1982). Akande investigated the factors that drove some students away from geography classes and those that kept others. He hypothesized: no difference in urban and sub-urban schools enrolment; relevance to practical life and availability of qualified geography teachers as motivating factors and too wide coverage as a repelling factor. Questionnaires were administered to a sample of 331 final year students. Enrolment for geography in school certificate examination was obtained. Results obtained showed that urban enrolment was significantly higher than sub-urban. Relevance of geography to practical life and availability of qualified teachers were found to be motivating factors while too wide coverage was confirmed as a repelling factor.

Osakwe (1982) ascertained the status of geography among secondary school students as well as the needs of the students with a view to examining how geography could help meet these needs. He reviewed the new (1981) National Policy on Education and some developments in school geography in Britain and then made suggestions on how geography teaching in Nigeria could be improved. He administered questionnaires to 1190 students in 19 out of about 300 secondary schools in Bendel State. The results obtained showed low rating for geography. Preference for geography ranked 10 out of 17 school subjects and 3rd out of 6 subjects within its subject group in terms of number opting for it in the school certificate examination. He suggested improvement of status and interest in geography by improving the content, teaching strategies, assessment procedures and equipment and by organising in-service training for geography teachers.

3. Techniques of teaching and teaching Materialsm

Both experimental and survey studies have been carried out on techniques of teaching and use of teaching materials in geography. Experimental studies (Onasanya 1982, 1985; Fom, 1982; Davwar, 1984) were mainly of pretest - post-test control group design.

Onasanya (1982) sought to find out whether performance of students would vary with various teaching strategies namely: Mastery learning (ML), Mastery Learning and Sample Studies (MLS), and, Conventional (C) approach. Two out of 15 coeducational schools in the Ijebu area of Ogun State were involved in the study. Three groups of 30 third-form students were randomly selected in each school. The topic "Soil types and factors influencing their formation" was taught to each group. Twenty-five teacher-made achievement test items were administered as the pre- and post-tests.

Analysis showed that ML and MLS resulted in significantly higher learning outcomes than conventional approaches. Age, school type, location and availability of resources had no significant effect on performance. Onasanya called for improvement in quality of instruction and recommended that teachers need to look for effective teaching strategies.

In 1985, Onasanya, using a similar approach to his 1982 study tried to determine the extent to which the use of "Student-Support Systems" can raise the level of student learning achievement higher than that obtained under the Mastery Learning approach. The three levels of teaching strategies used in the study were the Conventional (Group 1), Mastery Learning (Group 2) and the Enhanced Mastery Learning (Group 3). Group 3 is Mastery Learning combined with a Student Support System.

Twelve schools involved in the study were randomly selected from 51 secondary schools in Ogun State and then randomly assigned to each of the three learning conditions. A sample of 1,458 form three students was involved in the study.

Six validated teacher-made tests with item difficulty ensured were administered during the teaching process. A one-hour retention-test was also administered six weeks after the completion of the teaching experiment. The main statistical techniques employed in the analyses were Analysis of Variance and t-test. The results obtained showed that although the cognitive entry behaviour of the subjects in the three groups was significantly different, the highest mean score being obtained by the Conventional group, the post-test results in the three groups were significant in favour of Groups 2 and 3 average students.

The post-test results for male and female students in each of Groups 2 and 3 were not significantly different. The retention-test scores for the three groups were significantly different in favour of the students exposed to mastery learning strategies. Tutoring was recommended as an effective strategy. Nevertheless, the researcher recognised that this approach is too costly for most societies to bear on a large scale.

His suggestions for effective teaching of geography were: small group study organised to meet regularly to go over points of difficulty in the learning process, tutorial help, reading assignments, use of audio visual methods, use of sample and concrete objects, fieldwork and practical work.

Fom (1982) reported an experiment in which the difference in performances of students taught about the types of scale indicators used on maps with the overhead projector and using conventional teaching methods was investigated. The control group was taught using the conventional talk-chalk approach while the experimental group was taught with projected transparencies made of transparent cellophane bread wrapper. The transparencies contained explanations and diagrams which would aid understanding of meaning and types of scales. The sample consisted of 25 randomly selected subjects in each group. Three lessons were taught per week to each group for three weeks. Results obtained showed statistically significant higher performance levels by students taught using the overhead projector.

Davwar (1984) investigated the difference between performances of students taught geography using discovery and lecture methods. Two groups of thirty students each were taught using lecture and discovery methods in the four sampled schools. The same topics were taught to each group, and each lesson was followed by ten multiple choice objective test questions.

Analysis with Chi square and t-test showed that students taught by discovery methods performed significantly better than those taught by lecture methods. The discovery method was therefore recommended for effective teaching.

Survey research on teaching is exemplified by the studies of Anikweze (1982) and Okpala (1983). Anikweze (1982) aimed at indentifying the problems facing the effective teaching and learning of geography in 20 secondary schools in Kaduna State. He involved 482 final year students, 50 geography teachers, 14 principals, 6 vice-principals, 20 heads of geography teachers and the staff Inspector for Social Studies of the Kaduna Ministry of Education. Information was obtained through questionnaires, interview and observation. Data were analysed with percentages, Mann - Whitney U tests, z test and Spearman Rho. Those tests revealed that the causes of ineffectiveness in teaching and learning geography included insufficient quantity of trained geography teachers, poor teaching techniques, inadequate provision of teaching materials, poor entry behaviour caused by the teaching of social studies in junior classes and inadequate time devoted to the study of geography.

Okpala (1983) investigated the problems of poor geography teaching in secondary schools from the perspective of teacher education. The purpose of the study was to ascertain how far professional teachers in the field utilize the experiences which they were taught at college. The basic instrument for the study was a checklist of in-college experiences elicited from methodology course programmes of 7 of 13 departments of education in Nigerian universities and 7 colleges of education affiliated to them. The checklist was administered to 95 professional geography teachers from 75 secondary schools in 3 of 19 states in Nigeria. The experiences investigated were: use of teaching materials, geographical skills and professional skills. The teachers identified the experiences they were exposed to at college, those they utilized during teaching practice and those they are utilizing in the teaching field. Analysis using tetrachoric correlation showed a strong relationship between in college experiences and teaching practice, by very weak relationship between the former and the teaching field. It was suggested that there should be greater articulation between the colleges and the school so that whatever is taught at college will be practicable in the teaching field.

One study (Kalugula, 1981) was available on analysis of teaching materials. Kalugula analysed the readability indices of 8 popularly used geography books. He used the Dale - Chall Formula and the correction table for establishing the grade equivalent of the readability indices. Eight passages and reading tests were administered to penultimate school certificate class. Results of readability assessment indicated that most of the recommended popularly used geography books are used at the appropriate grade level. Statistical analysis of the reading comprehension test results (using Two-by-Two Factor Analysis of variance) revealed among other things that the readability of materials has a strong influence on reading comprehension.

Discussion

This summary of research in geographical education in Nigeria reveals that observable research designs are invariably experimental and survey based. The main issues addressed by surveys included student attitudes to the subject, their pattern of performance and ascertaining dominant strategies in teaching. These surveys, as well as the controlled experimental studies, have "pure" research motives. Pure research as used here means theoretical rather than implementation-oriented. Implementation-oriented research denotes research whose results are meant to have practical and plausible implications rather than derived implications to teaching and learning. Practical implications differ from derived implications in that while the former are sure to be applied to the classroom for improving teaching and learning, the latter are generalized suggestions which are made irrespective of evidence that such approaches may not be necessarily practised. Evidence of derived implications is clear in the research studies reviewed.

The surveys mentioned, all of which were provoked by deteriorating performance in school certificate geography, have revealed similar problems in the teaching and learning of geography. These problems include inability to cover the syllabus, insufficient time allocated to geography, perpetual use of lecture methods and note copying, little or no practical work and lack of funds for fieldwork and practical work. Results of process-product experiments show that some strategies and teaching materials could lead to better learning outcomes than others. Recommendations made in the experimental studies are mainly that teachers should improve their methods of teaching and provide adequate and suitable instructional materials. The findings of both survey and experimental research create a dilemma.

While surveyors (Anikweze, 1982; Okpala, 1983; Osakwe, 1982) point out problems of time and resources (financial and material) as some of the major factors that hinder effective teaching, experimentalists (Fom, 1982; Onasanya, 1982, 1985) recommended time consuming teaching strategies such as tutoring and expensive equipment such as projectors in an environment where the majority of the students do not have basic texts, schools lack basic equipment, and time is insufficient for teaching the numerous subjects in the time table. This dilemma creates the need for coordinated large scale research projects, action research, case-studies and exploration of other problem areas in the geographical education in Nigeria.

Suggestions

Survey research in geographical education which has investigated similar problems in isolated locations and have reported similar findings point to the need for large-scale coordinated research in geographical education in Nigeria. Nigeria has over 100 million people living in twenty-one states plus the Federal Capital Territory. Each state has several Local Government Areas (LGA). For example, Anambra state alone has twenty-three LGAs. The researchers reviewed in this paper mostly cover only one Local Government Area in a single state in Nigeria. The LGAs covered are mostly of the researcher's own home area or those accessible within the usual constraints of funds, time and transport. Area coverage of these studies in the context of the whole country is therefore inadequate.

Results of research studies carried out in isolated locations have revealed that negative attitudes in learners, unavailability of materials and funds, an insufficient number of teachers and poor teaching have contributed to a poor image of geography in schools. However, coverage of the country by these studies cannot be regarded as representative of the opinions of the whole clientele of school geography in Nigeria. There are also differences in student population, provision of resources and staffing condition in schools (private, federal and state owned).

It is necessary for survey studies on such aspects as attitudes to the subject, and problems of teaching and learning to be carried out nationally coverage particularly now that there is a national curriculum in geography. Reports of such a study would be invaluable in planning curricular changes. Such research should be exploratory in nature such as that by Brown on changes in the place and function of geography in the curriculum of Colleges of Commerce in Britain (cited in Naish, 1972). Another example is the Teachers' Questionnaire Survey (Schools Council, 1978) which was a precursor to the *Geography 16-19 Curriculum Development Project* in Britain. This survey involved 191 teachers from 106 educational establishments in England and Wales. This type of nation-wide research should have been carried out before the 1985 National Senior Secondary Curriculum for Nigerian Schools was structured.

Action research and case studies

While large-scale surveys are essential for eliciting information on common problems and as a prerequisite for promulgating national programmes, action research studies and case studies are necessary for intensive probing into specific classroom problems with the sole purpose of improvement of practice.

In Nigeria today most higher degree students are classroom teachers. Therefore, their research topics should arise from realistic classroom experiences and problems. Examples of such problem areas are: means of accommodating strategies such as tutoring, discussion, field studies, games and simulation and group work within the Nigerian classroom conditions; and skills in handling some topics and concepts in geography. For example, with regard to mapwork, concepts such as contour and gradient which students largely misconceive (Okpala, 1987) could be investigated in order to derive strategies for effective teaching.

Action research, which is concerned with the investigation of a specific problem in a specific setting for the purpose of problem-solving, is still non-existent in geographical education in Nigeria. Rather, research is based on speculated global problems and results in theoretical and sometimes impractical suggestions. In action research, investigations into concrete problems experienced by the researcher is realistic as topics are not selected *in vacuo*. The researcher is adequately motivated and favourably disposed towards the project. Feedback from such research is immediately translated into modifications, adjustments, directional changes, and re-definitions as necessary so as to bring about lasting benefit to ongoing processes rather than to some future event as has been the purpose of traditionally oriented research (Cohen and Manion, 1982).

Data collection in action researches which is largely behavioural or observational is similar to the methodology of case studies. The present predominance of the statistical-experimental research paradigm and surveyors who ask standardised questions to large samples have not probed realistically the problems of geography classrooms. The usual findings by surveyors that some problems exist and by experimentalists that Method A is preferred to B lead to utopian suggestions. Case study strategies which are observational and naturalistic with open techniques in collection and analysis of data would give greater insight into classroom problems and provide realistic information on tackling the problems.

This advocacy of case study approach does not imply condemnation of experimentation and surveys. Rather, it is a recommendation for triangulation. Triangulation implies use of two or more methods of data collection in a study. Hence experimentation of pre-test post-test design could be supported by observational techniques and questionnaires. With a combination of approaches (quantitative and qualitative) results obtained would be more comprehensive and there would be greater authenticity and confidence in the findings. By marrying approaches, objectivity will be maintained and there may be a more realistic implementation of findings.

In addition to a need for improvements in research techniques there is also a need for the extension of the content of research into other factors which could influence understandings of geography as yet unexplored in Nigeria. These include perceptual and conceptual problems and aspects of language and learning in geography classrooms.

Conclusion

Two major trends in research in Nigerian geographic education discussed are surveys and experimentation. Survey researches in isolated locations which neither provide a representative view of national problems nor make specific plausible suggestions were discussed. The dilemma in implementing findings of surveyors and experimenters in the Nigerian situation were highlighted. These problems necessitate a re-orientation of research design towards emphasis on action research, case studies and triangulation as means of enhancing objectivity and social relevance. Areas of research need also to be expanded to embrace the psychological dimension and the use of language as a means of discovering other factors that inhibit effective teaching rather than the present over-emphasis on surveys of attitudes, problems and performances, and comparison of methods through experimentation.

A case study of research in geographical education in Nigeria

The research study entitled "Factors Affecting Effective Teaching and Learning of Geography in Some Secondary Schools in Jema's and Kaduna Educational Zones in Nigeria" by Anikweze (1982) exemplifies the content and design of survey research projects in geographical education in Nigeria from 1981 to 1986. The research was primarily spurred by the poor state of geography in secondary schools. The ultimate goal was to make suggestions that would lead to improving the teaching of the subject.

As is typical of post-graduate research, the basic framework of this study is similar to undergraduate studies. Higher degree research differs only insofar as it involves a wider range of subjects and data collection techniques, larger sample sizes and the use of statistical tests of significance in data analysis. Despite all this sophistication, research findings do not have direct implication for classroom practice. There is a dire need for a reorientation of research towards realistic classroom practice.

The research report

1. Background of the study

The study was spurred by two problems: the low number of candidates selecting geography and the performance of these candidates in West African School Certificate examinations, and the need for "New geography" to be implemented in Nigerian schools. It was reported that average percentage performance in West African School Certificate geography examination in the best school in Kaduna State of Nigeria was 38.49 from 1977 to 1981 with 13.3 percent passing at the credit level. These scores and pass rates were typical of most schools in the State.

2. The Research questions

The Research questions to be answered in the study were:

a) Does sex exert any significant influence on the student's attitude to geography as a West African School Certificate subject?
b) Does the location of the school exert any significant influence on the student's attitude to geography as a West African Certificate of Education subject?
c) Are the secondary schools in Kaduna State adequately staffed with geography teachers in terms of both quality and quantity?
d) Is social studies laying a solid foundation for the study of geography for the upper classes of Kaduna state secondary schools?
e) Are the Secondary schools in Kaduna State equipped with teaching materials in adequate quantities for effective learning of geography?
f) Does the students' perception of their ability in mathematics affect their choice of geography as a West African School Certificate subject?
g) What is the most common teaching method used by the Kaduna State geography teachers?
h) How often do the geography teachers make use of aids and teaching materials to illustrate their lessons?
i) What is the attitude of students towards tests and assignments in geography?
j) What is the attitude of geography teachers towards tests and assignments in geography?
k) What is the attitude of students towards field studies in geography?
l) What is the attitude of geography teachers towards field studies in geography?

These questions were to be considered in the context of three hypotheses.

a) There is no significant difference in attitude to geography between male and female students in the secondary schools in Kaduna State.
b) There is no significant difference in attitude of geography between students in secondary schools in urban areas and their counterparts in the rural areas.
c) There is no relationship between the number of qualified geography teachers and the proportion of students offering geography to WASC/GCE level.

3. The area of study and the sample

The area of study was Kaduna and Jema's Educational Zones (an urban and rural area respectively) in Kaduna State in Nigeria. Jema's and Kaduna are two educational zones out of eight in the State. Students in years three to five were involved in the study. All the twenty schools, from the two educational zones were involved. Based on a 5% random sampling procedure, a total of 500 students (25 from each of the 20 schools) was contacted. In addition, 50 geography teachers, 14 principals, 6 vice principals, 20 Heads of geography departments and the Staff Inspector for Social Studies of the Ministry of Education, Kaduna, were invited to respond.

4. Data collection

Two sets of questionnaires were administered personally to the subjects. The students, questionnaire elicited information on the school, the geography teachers, teaching techniques, use of teaching aids, engagement of spare time in the study of geography, experience acquired from inter-disciplinary studies and their assessment of their academic performance in mathematics. The teachers' questionnaire elicited information on teaching load, materials available, techniques adopted, students' performance and use of students' spare time for study of geography.

Using two structured interview schedules, information on the popularity of geography as a school subject, staff disposition, provision of materials, teaching techniques and opportunities for inservice training programmes were elicited from the principals and the heads of geography at the Ministry of Education, Kaduna.

The reliability of the questionnaires was ascertained through a pilot study in which 60 geography students from 6 schools in the area of study and 20 teachers were involved. The Split-Half (Odd-Even) method was used in estimating the internal consistency of the feedback. The face-validity of the questions was ascertained by experts.

5. The analysis of the data

The scaled responses from the questionnaires were converted to an interval scale. The frequencies of the responses were obtained and the hypotheses were tested with Mann-Whitney U Test of Attitudes, z test (significance ascertained for a two tailed test) and Spearman Rho.

6. The main findings

The main findings were as follows:

1. On sex (gender) and attitude to geography as a school certificate subject, females had a significantly more positive attitude than males ($z = 4.5192$).
2. There was no significant difference in the attitudes towards geography of students in boys schools and mixed schools ($z = 1.0359$).
3. There was a significant ($z= -4.5870$) difference in attitude to geography between urban and rural students. Urban students had more positive attitude.
4. There was a significant positive relationship ($P = 0.90$) between the number of qualified teachers and the number of students who offer geography at school certificate level.
5. On average, with standard class sizes of 35, 56% of the secondary schools in the two educational zones had too few geography teachers.
6. 36% of teachers perceived their teaching load to be too heavy, 56% felt it was adequate, while 8% wanted more work. Over 56% of the teachers had classes of over 40 pupils.
7. There were too few qualified teachers.
8. Information from teachers and students on the foundations laid for geography by the study of social studies in junior forms showed that good foundations are laid where the social studies teacher is a geographer but is poor if he/she is not.
9. 12.9% of the students indicated that they have enough textbooks, 21% felt that provision was sufficient, while 44.6% regarded provision as insufficient. 21.6% of students indicated that they had no textbooks at all for learning geography. Of the teachers, 82% indicated that the provision of textbooks was inadequate.
10. 56.2% of students did not make any use of the books in the library. The reasons given for this were a lack of books in school library (16.2%); the numbers of geography books too few for the number of geography students (41.5%); preferred reading their own books (9.8%); and teacher failed to make reference to the books (8.5%).
11. Teachers felt that students did not spend enough of their private time on geography while the majority of the students felt that they did.
12. From analysis of the checklist on teaching materials, 40% of the schools had weather stations but only 15% were equipped with weather instruments. No school had a sand tray and tracing tables; 35% had projectors but only 20% used them, 20% had tape-recorders, and 15% had facilities for storing and displaying rock samples. All schools had duplicating machines.
13. Students did not seem to realize that knowledge of mathematics could help them in understanding geography lessons.
14. 51% of the students indicated that they had a geographical association in their schools while 19.7% indicated active participation in terms of organising film shows, excursion, projects.
15. Teachers responses indicated that their most commonly adopted teaching method was: lecture (6%), discussion (30%), problem-solving (14%), and assignment (8%). 38% varied their methods while 4% were uncertain about which method they used. Only 10% of the teachers indicated an awareness of recent emphases on problem-solving; 60% of heads of geography departments spoke strongly in favour of field studies; 50% emphasized quantification in description of geographical features and 35% of teachers were aware of the use of models for improving geography teaching.
16. 82% of the teachers indicated that they teach their children as mixed ability groups and predominantly directed their explanations towards those in the middle of the ability range.

17. The majority of teachers (88.0%) support: remedial programmes in the form of extension lessons for backward students; reteaching important lessons to the whole class; elaborate use of teaching aids and group projects.
18. 80% of the teachers responded that the provision of teaching aids was unsatisfactory.
19. 32% of the teachers indicated that they present only geographical facts which avoid controversial issues.
20. 28% of teachers indicated that they always use a variety of teaching aids; 20% often; 50% occasionally; and 2% not at all.
21. 72.8% of students had a positive attitude to tests. No significant difference was observed between males and females.
22. On investment time for making of tests, 34% of teachers indicated always, 58% occasionally and 4% never.
23. 74.3% of the students indicated a positive attitude towards field studies. No significant difference was observed between male and female students but there was a significant difference between the attitudes of urban and rural students.
24. The majority of teachers (92%) indicated a positive attitude towards fieldwork. 6% of the students indicated that they undertook field studies very often, 8% often, 66% sometimes and 20% not at all. Inter-views with heads of geography departments revealed that field work was equated with long distance excursion or field trips for site seeing. Hence, virtually all interviewers complained about lack of time, funds and transport for embarking on field studies.

7. Conclusions

The conclusions drawn from the study were that:

1. the quantity of trained teachers in the sampled schools was insufficient;
2. the provision of teaching materials and books was inadequate;
3. social studies in Forms I and II did not lay a sound foundation for the study of geography in the upper classes;
4. many students devoted insufficient time to the study of geography;
5. many secondary schools did not have active geography societies, and;
6. very little attention was given to geographical field studies.

8. Limitations of the study

There are weaknesses in the design of the study which the investigator recognised, and tried to rationalise. Examples are as follows:

1. Questionnaires were used instead of observation of teaching in determining dominant teaching methods due to "time", "tedium" and concern for teachers' reaction to being observed.
2. Students' abilities in mathematics were elicited through questionnaire instead of testing their performance. The reason for not using the school records was that anonymity was required.

9. Suggestions resulting from the study

The researcher suggested that:

1. the number of trained geography teachers, especially women, be increased;
2. classes be streamed by ability, or alternatively that teachers should pitch their explanations in mixed ability classes at the bottom and progress upwards;
3. geography teachers should be sponsored to attend refresher courses, seminars and workshops;
4. teachers should try to improvise and every school should possess a sand tray, a geographical garden containing a weather station and models of tectonic, erosional and depositional feature. Teachers should organise students to mould these with clay and cement;
5. topographical maps should be centrally procured through the ministries. Teachers should reproduce maps on stencils;
6. four periods a week should be allocated to geography with two as a double period. There should also be proper coordination between geography and social studies teachers;
7. assignments (assigned reading and exercises) should be given regularly to students;
8. all geography students should be encouraged to form and participate actively in school geographical societies. The geographical society should be used to produce teaching resources such as the identification of local examples and the construction of geographical gardens;
9. geography teachers should seek integration and interdisciplinary cooperation with maths and English teachers;
10. teachers should be encouraged by basing their promotion on merit and hard work.

10 Suggestions for further research

The research suggested:

1. carrying out a similar research in other educational zones;
2. examining the causes of the observed significant difference in attitude to geography between male and female students in the two educational zones;
3. determining the exact relationship between geography and social studies taught in lower secondary classes;
4. determining the quantum of transfer from maths to geography;
5. investigating the attitude of teachers and students towards the provision and use of geography textbooks and other teaching materials as students feel reluctant to buy textbooks and teachers are reluctant

Issues in Nigerian research

Three issues arise from this report of Anikweze's which indicate the key problems faced by research in geographic education in Nigeria. These problems relate to the research locations chosen, and the conceptual frameworks and data collection techniques adopted.

1. Research locations

The research studies, particularly surveys, undertaken in geographic education at the higher degree level tend to cover very restricted and isolated locations. The study reviewed above, for example, involved twenty schools in two of the eight educational zones in the state. Reasons given for the limited area coverage include limitations of time and money. These studies usually suggest that future research should be extended to the other Local Government Areas in the state and to the other states in the country.

The most probable reason for researchers choosing a particular area is their preference for working near their work place or home area. They may expect the greatest levels of cooperation in such areas because students and teachers often have negative attitudes to researchers. They perceive researching as a bother and as being irrelevant for it makes no positive contribution to preparing students for school certificate examinations. Even in familiar locations researchers get marginal cooperation, and therefore avoid using techniques which their subjects might resent, even when these techniques would be highly pertinent to their studies. For example, Anikweze assessed teachers' dominant methods through information elicited from questionnaires. One of his reasons for not observing the teachers personally was that "teachers might revolt against what would appear like giving them an unwarranted teaching practice supervision" (Anikweze, 1982: 172). Anikweze carried out the research around his work area. As a teacher-educator his trainee teachers undertake their teaching practice in this area. If he felt so cautious while working in a familiar area, it may be expected that the constraints of researching in an unfamiliar environment would be even greater.

Researchers also work in familiar areas to reduce both tedium and cost. Mailed questionnaires are rarely returned. Researchers such as Anikweze usually administer questionnaires personally and either wait to collect them or call after a few days.

2. Conceptual frameworks

Conceptual framework refers to the problem or issue which the researcher investigates. In geographic education in Nigeria, the areas of concern to researchers are relatively limited.

Investigations into attitudes to geography, the reasons for poor performance, the availability of teachers and materials which predominate in undergraduate survey research are also investigated at the post-graduate level. Rather than investigating concrete problems which graduate teachers encountered in the field after initial professional training, post-graduate research is merely an extension of undergraduate research with more extension of undergraduate research with more questions, more schools, a greater variety of data collection, instruments and subjects and a little more sophistication in the statistical techniques used. Hence Anikweze's (1982) study is similar in its conceptual framework and findings to undergraduate research studies on attitudes and resources for geography teaching carried out by Nnachi, 1981; Achufusi, 1984; Murewa, 1984; Isong, 1985; Ndigwe, 1985; and Fasole, 1986.

Such superficial extensions of undergraduate studies can also be observed in other areas. For example, Nwagu's (1985) "Validity of Teacher-Made Geography Tests" was an extension of Okpala's (1974) study. While Okpala used 6 schools in 3 Educational Zones, and presented her results as percentages, Nwagu used 15 secondary schools in 5 Educational Zones and used statistical test of significance.

3. Data collection

Although data in the example described above were collected from various subject groups, the superficiality of some of the questions casts doubt on the validity of the conclusions drawn. Responses to three such questions are presented as Figures 44.1, 44.2 and 44.3 below.

Category Label	Absolute Frequency	Relative Frequency %
Yes	16	32
No	20	40
I don't know	14	28
Totals	50	100

Figure 44.1 Responses of teachers to the question: "Do your students have enough time for their private study of geography?"

Response Choice	Absolute Frequency	Relative Frequency %
Too many extra curricular activities	5	10
More time spent on preferred subjects	11	22
Too many things to do at home	4	8
Reasons personal to them	30	60
Total	50	100

Figure 44.2 Responses of teachers to the question: "Which of the following do you think consumes most of your students' private time?"

Category Label	Absolute Frequency %	Relative Frequency %	Cumulative Frequency %
Lecture method	3	6.0	6.0
Discussion method	15	30.0	36.0
Problem solving method	7	14.0	50.0
Assignment method	4	8.0	58.0
All of the above	19	38.0	96.0
None of the above	2	4.0	100.0
Totals	50	100.0	

Figure 44.3 Responses of teachers to the question: "Which of the following teaching methods do you adopt in your teaching?"

Anikweze concluded from the data summarised in Figures 44.1 and 44.2 that students did not spend sufficient time on private study of geography due to "lack of intrinsic motivation" (Anikweze, 1982: 126). This conclusion is contradicted elsewhere in the study by the students' own responses to similar questions which suggest that their geographical studies occupy substantial periods of time.

The use of questionnaires in eliciting information on observable behaviour such as teaching strategies utilized in geography classrooms is also erroneous. The data summarised in Figure 44.3 led Akinweze to conclude that the majority of teachers adopted methods other than lecturing.

The validity of this conclusion is questionable since the results obtained contradict the findings of observational studies (Arowosegbe, 1981; Okpala, 1983, 1987) which showed that lecture methods predominate in geography lessons.

A further methodological flaw which was acknowledged by the researcher was to elicit students' academic ability in mathematics by asking them the questions "How good are you in mathematics with reference to your scores in tests and examinations?".

Although the researcher tried to rationalize this limitation, the inappropriateness of the data collection technique renders the analysis invalid.

Emphasis on the use of inferential statistics is a common feature of research in Nigeria in the 80s. Such statistical techniques have become synonymous with high quality research, sophistication and involvement in "new approaches" (Anikweze, 1982) in geographical studies. Anikweze conceptualized "new geography" on the basis of Graves' (1972) emphasis on geography as a science subject employing quantitative assessment of data, Gould's (1969) idea of experimental investigation based on problem-solving and Majasan's (1969) logical scientific deductions. This perspective on new geography which has permeated research in geographic education in Nigeria from the 70s into the 80s explains the emphasis placed by the researcher on quantification in school geography.

Explanations for the Nigerian research tradition

The most obvious explanation for the emphasis on scientific problem-solving in research in geographic education in Nigeria is the absence of higher degree programmes in geographic education in Nigerian universities. All higher degree research on the teaching of geography was undertaken by candidates specialising either in *Curriculum Studies* or *Measurement and Evaluation*. The conceptual and philosophical basis of such research cannot therefore reflect recent orientations in geographic education as these researchers take courses in *Research Methods in Education* and in their major professional area. Thus, their research orientation in geographic education is limited to their undergraduate experiences. Sometimes such higher degree researchers lack guidance when a geography educator is not available to supervise the project. Examples here are provided by Anikweze (1982) who was supervised by a mathematics educator and Nwagu (1985) who was supervised by a biology educator who also specialized in *Curriculum Studies*.

There is a dire need for post-graduate courses in geographical education in Nigerian universities to provide adequate grounding for research in the area. Where a specialist geography educator is not available, the Department of Geography should mount at least one relevant course on methodology and recent trends in geography for students specialising in *Evaluation in Education* and *Curriculum* who wish to research into geographic education. Co-supervisors should be co-opted from the Department of Geography.

Researching in geographic education in Nigeria lags behind current trends in concepts and methodology of geography and geographic education.

Hence, quantitative analysis/scientific problem-solving which dominated geographic thought elsewhere in the sixties is still regarded as "new geography" in Nigeria. By the seventies, geographers had started to rethink the structure of the discipline. Due to the artificiality and poor utility value of quantitative designs, geographers and geography educators (Tuan, 1974; Wolforth, 1976; Berry, 1980; Graves, 1981; Huckle, 1981) reject subsuming geographical studies under any specific paradigm and stress that quantitative and qualitative approaches should be varied as a means of maintaining objectivity as well as social relevance in solving environmental problems.

Suggestions for improving research in Nigeria

Rather than concentrating on pure surveys, which investigate many research questions, ask several groups of subjects a long list of questions, and come out with a long list of findings and recommendations whose implementation are not within the powers of the classroom teacher, researchers in geographic education in Nigeria should be reoriented towards finding possible solutions to specific classroom problems in a limited number of classrooms. Possible areas for research include such strategies as minimally structured games and simulations within the limited teaching time allocated to geography and the structure and application of new materials in teaching mapwork which is an area perceived as most difficult by students (Ndu, 1973; Okonkwo, 1977; WAEC, 1975-1984; Uwaya, 1985). Research into such realistic issues which arise from classroom need will not only lead to results of more practical value but will also minimize the problems of funds, time, lack of cooperation and anonymity which are now presented by researchers to justify their use of inadequate techniques.

Such re-orientation of research efforts and the establishment of higher degree programmes in geographical education in our universities are urgently needed if research in geographical education in Nigeria is to improve.

REFERENCES

Achufusi, U.O. (1984) *Factors Influencing Students' choice of Geography in West African School Certificate Examination: A Survey in Njikoka Local Government Area of Anambra State*, Unpublished B.Ed. Dissertation, Benin City University of Benin.

Akande, M.O. (1982) "Withdrawal from the Geography Class: A study of the "Push" and "Pull" Factors", *The Nigerian Geographical Journal*, 25 (12), 105-117.

Anikweze, C.M. (1982) *Factors Affecting Effective Teaching and Learning of Geography in Some Secondary Schools in Jema's and Kaduna Zones in Kaduna State*, Unpublished M.Ed. Dissertation, Nsukka, University of Nigeria Nsukka.

Arowosegbe, J.O. et al (1981) *A Survey of Teachers' Methods of Teaching Mapwork in Geography in secondary Schools in Enugu, Awka and Igbo-Etiti Local Government Areas in Anambra State*, Unpublished B.Sc. Education Dissertation, Nsukka, University of Nigeria Nsukka.

Berry, B.J.L. (1980) "Creating Future Geographies", *Annals of the Association of American Geographers*, 70 (4), 450-480.

Cohen, L. and Manion, L. (1982) *Research Methods in Education*, London, Croom Helm.

Davwar, G.J. (1984) *An Investigation into the Effectiveness of the Lecture and Discovery Methods in Geographic Education in Some Selected secondary schools in Jos township of Plateau State*, Unpublished M.Ed. Research Project, Jos, University of Jos.

Fasole, J.A. (1986) Factors Influencing Student Choice of Geography and their performance in School certificate Examinations in Ikala Local Government Area, Ondo State, Unpublished B.Ed. dissertation, Benin City, University of Benin.

Federal Republic of Nigeria (1981) *National Policy on Education* (Revised), Lagos, Nigerian Educational Research Council.

Fom, P.M. (1982) *Using the Overhead projector in Teaching the types of Scales used in practical geography*, Unpublished M.Ed. Research Project, Jos, University of Jos.

Gould, R.P. (1969) "Methodological Developments Since the Fifties", *Progress in Geographical International Reviews of Current Research*, 1, 3-24.

Graves, N. Ed. (1972) *New Movements in the Study and Teaching of Geography*, London, Temple and Smith.

Graves, N.J. (1981) "Can Geographical Studies be sumsumed under one paradigm or are a plurality of paradigms inevitable?" *Terra*, 93 (3).

Huckle, J. (1981) "Humanistic Geography: an Introduction", in Wiegand, P. and Orrell, K. eds. *New Leads in Geographical Education*, Sheffield, The Geographical Association.

Isong, E.O. (1985) *Students' Attitude Towards Geography Studies: A Case Study of Obubura Local Government Area of Cross River State*, Unpublished B.Sc. Geography Education Dissertation, Port Harcourt, University of Port Harcourt.

Kalugula, C. (1981) *Readability of Geography Textbooks in Oyo State Secondary Schools*, Unpublished M.Ed. Dissertation, Ibadan, University of Ibadan.

Majasan, J.A. (1969) "New Dimensions in Geography Teaching in Nigerian Schools", in Majasan, J.A. ed. *New Dimensions in Nigerian High School Geography*, Ibadan, The Nigerian Geographical Association and Institute of Education, University of Ibadan.

Murewa, J.P. (1984) *Some Factors Influencing Students' Choice of Geography in WASC or GCE. A Case Study of Selected Secondary Schools in Ilesha Local Government Area of Oyo State*, Unpublished B.Sc. Education Geography, Port Harcourt, University of Port Harcourt.

Naish, M.C. (1972) *Some Aspects of the Study and Teaching of Geography in Britain: A Review of Recent British Research* No. 18, Sheffield, The Geographical Association.

Ndigwe, V.O. (1985) *The attitude of students towards Geography in Secondary Schools: A Case Study of Awka Local Government Area of Anambra State*, Unpublished B.Ed. Dissertation, Benin City, University of Benin.

Ndu, A.N. (1973) *Attitude to Geography*, Unpublished B.Sc. Education/Geography Project, Nsukka, University of Nigeria Nsukka.

Nnachi, P.O. (1981) *The Status of Geography as an Academic Discipline in selected Secondary schools of Afikpo Local Government Area of Imo state*, Unpublished B.Ed. Geography Dissertation, Benin City,University of Benin.

Nwagu, E.K.N. (1985) *Validity of Teacher-Made Geography Tests Used in Secondary Schools in Anambra State*, Unpublished M.Ed. Research Project, Nsukka, University of Nigeria Nsukka.

Okonkwo, L.O. (1977) *Major Areas of Students Difficulty in Secondary school Geography*, Unpublished B.Sc. Education Dissertation, Nsukka, University of Nigeria Nsukka.

Okpala, J.I.N. (1974) *An Evaluative Study of Teacher-Made Geography Tests in Geography*, Unpublished B.Sc. Education Dissertation, Nsukka, University of Nigeria Nsukka.

Okpala, J.I.N. (1983) *The Link between Teacher Education and the Teaching of Geography in Nigerian Secondary Schools*, Unpublished M.A. Geography in Education Dissertation, London, University of London Institute of Education.

Okpala, J.I.N. (1987) *The Feasibility of Reality Oriented Problem Solving questions in WASC Examinations as a means to Improving the Teaching and Learning of Mapwork in Nigerian Secondary Schools*, Unpublished Ph.D. Thesis, London, University of London Institute of Education.

Oluyeba, N.F. (1981) *An Appraisal of Trends in Performance of Students in Geography*, Unpublished M.Ed. Dissertation, Ibadan, University of Ibadan.

Onasanya, M.K. (1982) *The Effects of Quality of Instruction on the level of Student Performance in Geography*, Unpublished M. Phil Dissertation, Ibadan, University of Ibadan.

Onasanya, M.K. (1985) *Beyond Mastery Learning. The Effect of Combining Student - Support System with Feedback - Corrective on Learning Outcomes in Geography*, Unpublished Ph.D. Thesis, Ibadan, University of Ibadan.

Osakwe, E. (1982) *The Need for Curriculum Renewal in Nigeria School Geography*, Unpublished M.A. Geography in Education Dissertation London, University of London Institute of Education.

Schools Council (1978) "A Summary Report of the teachers' Questionnaire Survey", *Geography 16-19 Curriculum Development*, London, University of London Institute of Education.

Tuan, Yi-Fu (1974) *Topophilia: a Study of Environmental Perception Attitudes and Values*, London, Prentice Hall.

Uwaya, P.E. (1985) *A Survey of some Factors Affecting Students' Performance in Geography in Secondary Schools in Etsakor Local Government Area of Bendel State*, Unpublished M.Ed. Dissertation, Ibadan, University of Ibadan.

WAEC - West African Examination Council (1975-1984) *Chief Examiners, and Moderators' Reports*, Lagos, West African Examinations Council.

Wolforth, J. (1976) "The New Geography - and After?" *Geography*, 61 (1), 143-148.

45: A SURVEY OF THE TEACHING OF GEOGRAPHY IN WEST GERMAN SCHOOLS IN THE 1980s

Gunter Niemz

At the beginning of the 1970s geography teaching in West German schools was reformed. The aim of the reform was to improve geographical education by enabling pupils to cope successfully with matters of relevance to their daily lives. These included participation in decisions concerning their neighbourhood, hometown or region, their ability to use geographical data and information in their professional and private lives and their ability to plan vacation trips and to read maps. The reformed aims regarded topical geography as more important than regional geography, and the ability to do things as more important than just knowledge. Dissatisfaction with what had been achieved in geography teaching up to this time led to the introduction of a hierarchy of teaching objectives. Syllabuses and textbooks were published which emphasized topical geography and teaching objectives. Regional geography and the knowledge of locations were discarded.

Many didacticians and teachers of geography opposed this radical change and emphasized the importance of regional geography and knowledge of locations for every-day life (Birkenhauer, 1970). A few years later parents, teachers, chambers of commerce and journalists, also began to complain that the younger generation leaving our schools had very little knowledge of regional geography and almost no idea of locations. They pointed out that such knowledge was needed in business and private life, and that geography in schools had the responsibility to provide it.

Faced with this situation a research project was proposed with the primary aim of finding out what was actually being taught in school geography. It was no secret that many teachers omitted certain parts of their textbooks and the syllabuses published by their ministries of education, mainly because of lack of time.

A second aim of this project was to get a realistic picture of the teaching methods and media, field work, assignments and achievement being adopted in the teaching of geography in West German schools. These data were also intended to be used for comparative studies in the future.

Finally, it was intended that the project would provide some suggestions for improving the teaching of geography in the 1990s.

Planning, preparation, and performance of the survey

To get a realistic picture of the present teaching of geography in West German schools, a survey was planned to cover all ten West German states and West Berlin, because the syllabuses published by the different ministries of education differ from state to state. As it was impossible to pay interviewers in each of these states, it was decided to use questionnaires. These questionnaires consisted of not more than four pages to avoid imposing too much additional work on teachers and to ensure a high return rate of questionnaires.

A pilot study was carried out in one of the states (Niemz, 1984a). The German Research Foundation and the Association of German School Geographers supported the project. The ministries of education in the different German states gave their permission on condition that the survey was done on a voluntary and anonymous basis. A random sample of schools was taken from the official school lists of each state and West Berlin. A questionnaire was sent to each school for each year group, and the headmasters were asked to co-ordinate their administration and return.

Almost 6000 completed questionnaires of about 30,000 were returned, i.e. about 20% (See Figure 45.1). The data were coded and then processed in our university computer according to the different states, types of schools, grades, and teaching experience of the teachers.

Results of the survey

The survey showed that topical geography predominates in West German schools, but that regional geography and location exercises play an important role. Figure 45.2 shows the rankings of various geographical topics according to the number of schools teaching them and the number of periods in which they are taught. The top ranks are taken by the theme groups 27, 17, 25, 40, 1, and 37, which contain a considerable amount of regional geography. Regional geography of Germany ranks 11, and the regional geography of European countries ranks 10 or 13.

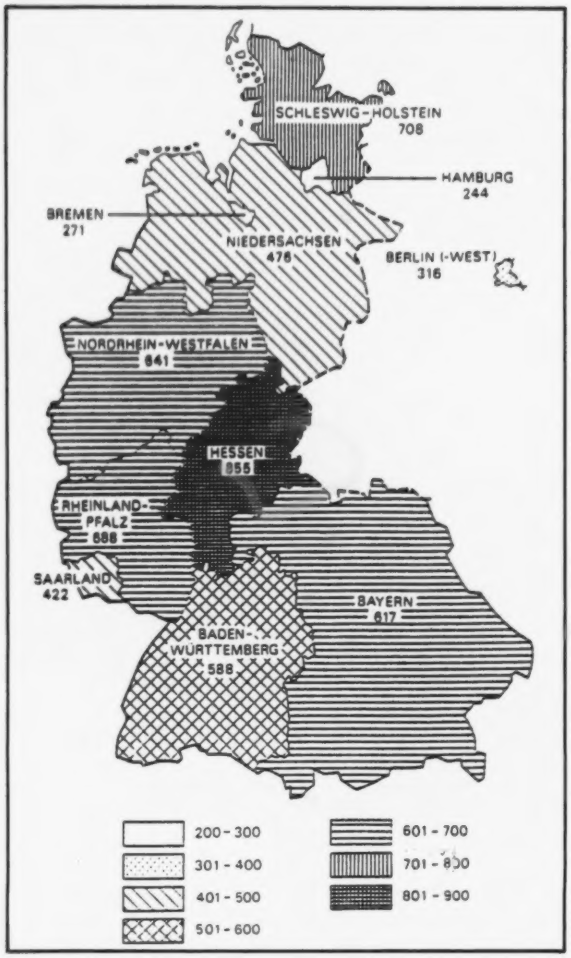


Figure 45.1 The number of completed questionnaires returned from the various West German states and from West Berlin.

Almost 90% of the teachers involved in the survey agreed that pupils have less knowledge of regional geography and locations than before the reforms (See Figure 45.3), and that consequently they once again emphasize regional geography and location exercises in their classes. (Similar developments are taking place in England, as shown by Williams, 1987, 85-86).

The majority of the teachers involved in the survey is dissatisfied with the syllabus for geography in their state and the textbook for geography in their schools (See Figure 45.4). Reasons given for this dissatisfaction include the lack of regional geography and of location exercises, the fact that certain themes - mainly in physical geography - are allocated to the lower grades and the specification of teaching objectives which are too difficult.

Surprisingly, themes like "Planet Earth" which includes the origin of the seasons, day and night in different latitudes, tides, the calendar, and solar and lunar eclipses, and "Earth and Universe" which includes themes such as

Theme of Geography Lessons	Rankings	
	L	P
1 Orientation on Earth	4	5
2 At the coast	17	13
3 In mountatin regions	24	21
4 In the cold areas	22	26
5 In dry regions	18	10
6 In tropical rain forest	21	23
7 Agriculture in mid latitudes	12	8
8 Traffic	25	25
9 Mining and resources	15	15
10 Industries	28	28
11 Tourism and recreation	31	31
12 Big cities	30	27
13 Town and country	39	38
14 Natural hazards	16	22
15 Landforms and their origin	9	9
16 Weather	23	24
17 Climate and vegetation zones	1	2
18 Regional geography of Germany	11	11
19 Location of places in Germany	36	36
20 Planet Earth	26	29
21 Earth and universe		
22 Innovations	42	42
23 Human races and cultures	20	17
24 Aid projects for developing countries	33	34
25 Developing countries	3	3
26 Poverty and hunger	41	40
27 Comparison of selected countries of different economics and political systems	2	1
28 International economic, political and military alliances and organisations	29	33
29 Changes in agriculture	32	32
30 Fishing	43	43
31 European countries	13	10
32 Population geography	38	37
33 Urban geography	10	16
34 Economic geography	7	7
35 Energy	35	35
36 World economy and trade	19	20
37 Environment	5	6
38 Regional planning	14	12
39 Regions of international conflicts	40	41
40 Geography of regions outside Europe	6	4
41 Location of places	8	14
42 Map reading and other geographical skills	37	39
43 Other geographical themes	27	18
L = Rank in number of listings P = Rank in numbr of periods taught		

Figure 45.2 The rankings of geography themes taught in grades 5-10 in West German schools.

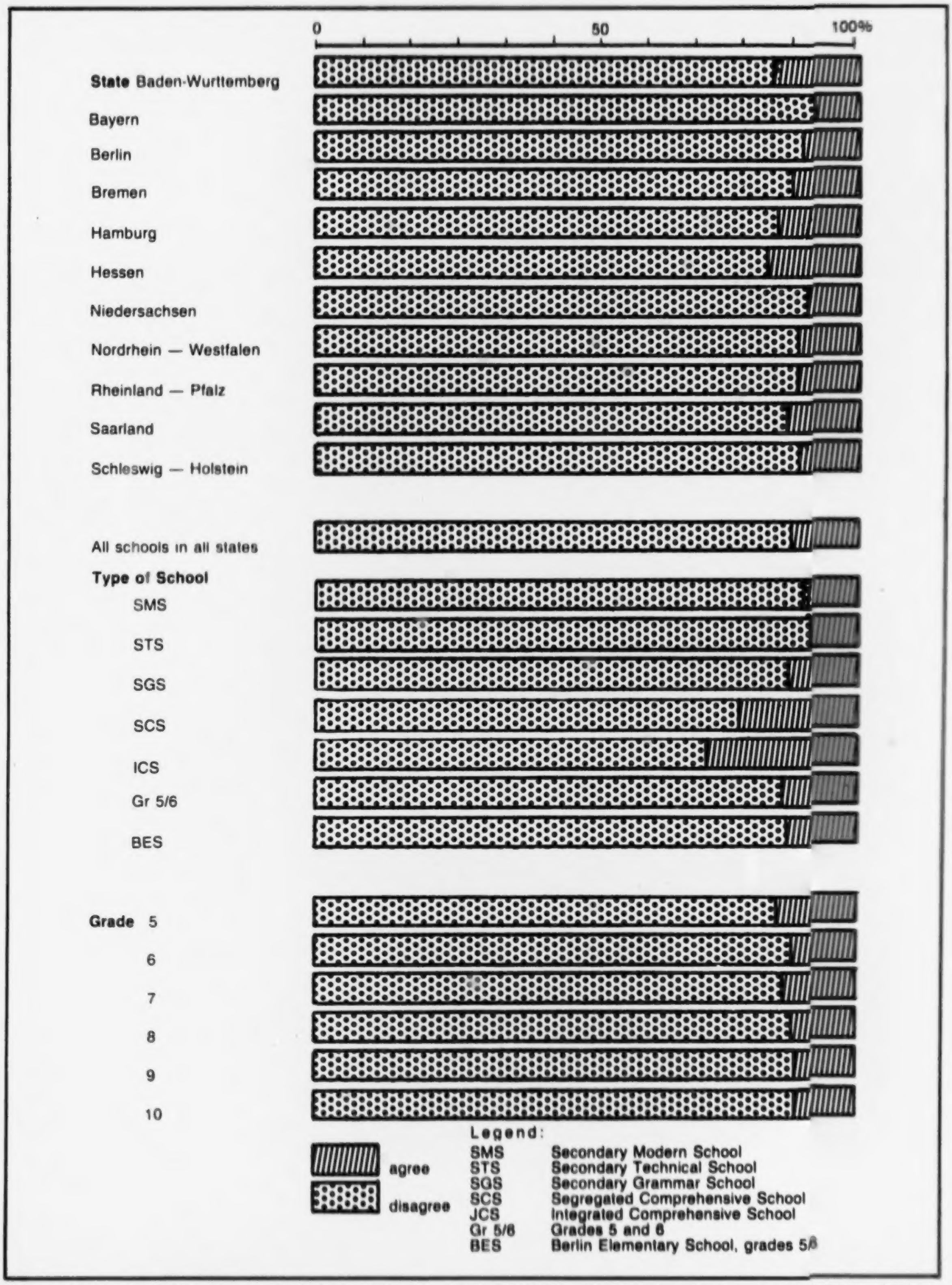


Figure 45.3 The percentages of teachers who agree with the criticism that the introduction of topical geography has resulted in pupils having an insufficient knowledge of regional geography or the location of specific places.

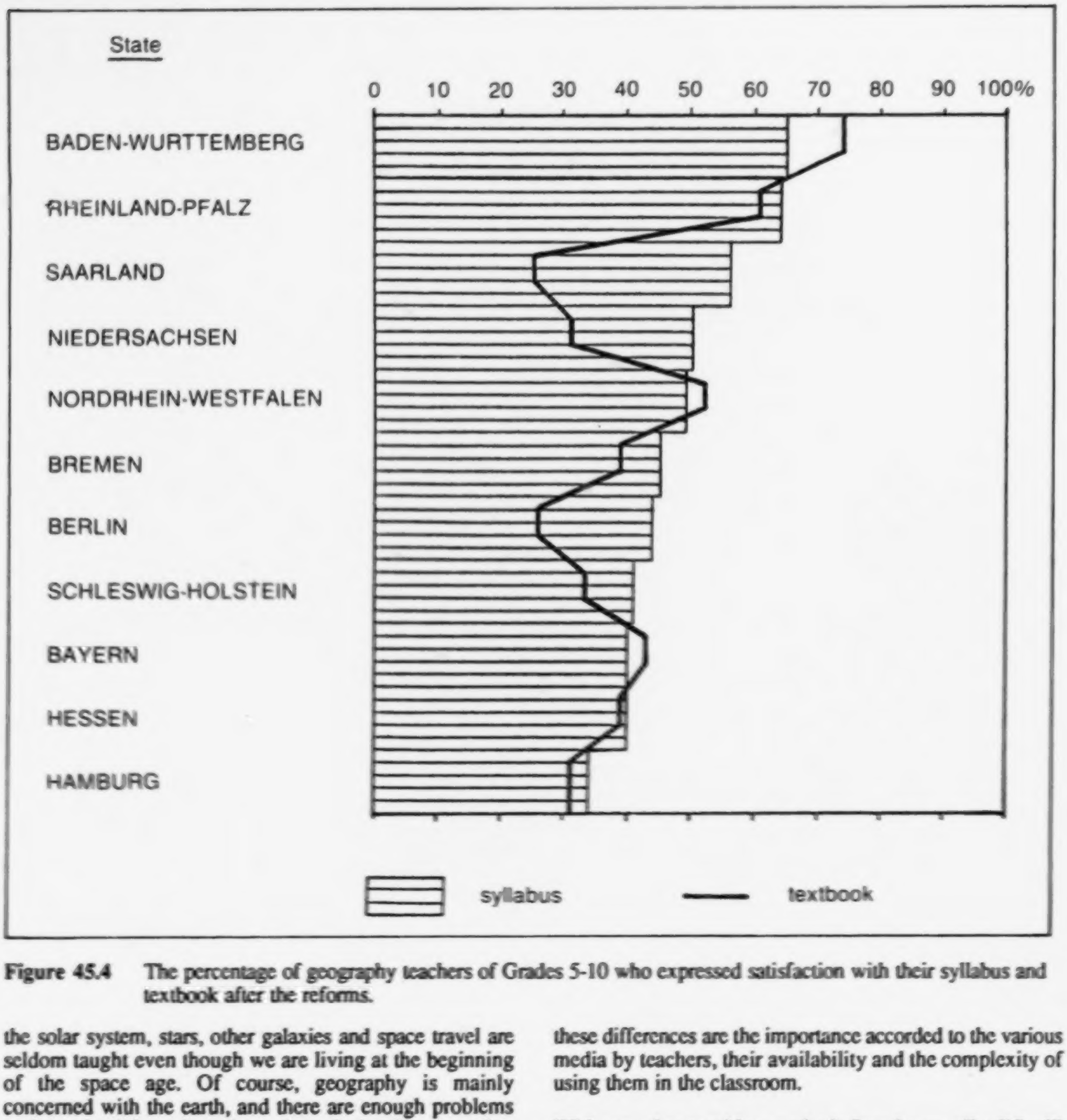


Figure 45.4 The percentage of geography teachers of Grades 5-10 who expressed satisfaction with their syllabus and textbook after the reforms.

the solar system, stars, other galaxies and space travel are seldom taught even though we are living at the beginning of the space age. Of course, geography is mainly concerned with the earth, and there are enough problems to be solved here but since there is hardly any other school subject in which such themes can be discussed, and our pupils are very interested in space and the universe, we should not leave such matters to television fantasies such as Star Wars, flying saucers and little green men from Mars.

Concerning media, it was found that atlases are now used more often than the textbook and overhead transparencies more often than film or slides (See Figure 45.5).

Older teachers having more teaching experience obviously prefer textbook and wall map whereas younger teachers prefer overhead transparencies (See Figure 45.6). Surprisingly more than 50% of the younger teachers do not use television at all in their classes. Among the reasons for these differences are the importance accorded to the various media by teachers, their availability and the complexity of using them in the classroom.

With regard to teaching methods "teacher-pupil-talk" still is the dominating method (See Figure 45.7), followed by lectures. Group activities require much preparation and are time consuming. Programmed instruction (Mager, 1961, Schrettenbrunner, 1978) is apparently no longer popular. Project work requires much enthusiasm, additional time and work for pupils and teachers and therefore cannot be undertaken very often (Niemz, 1978) even though it is regarded as an excellent way of achieving modern goals in the teaching of geography. Papers, presented by pupils play a minor role in grades 5-10. Games, though highly recommended (See Haubrich, this volume) are seldom used.

Field work is still rarely undertaken (only 23.5% teachers attempted it) although its importance has been repeatedly

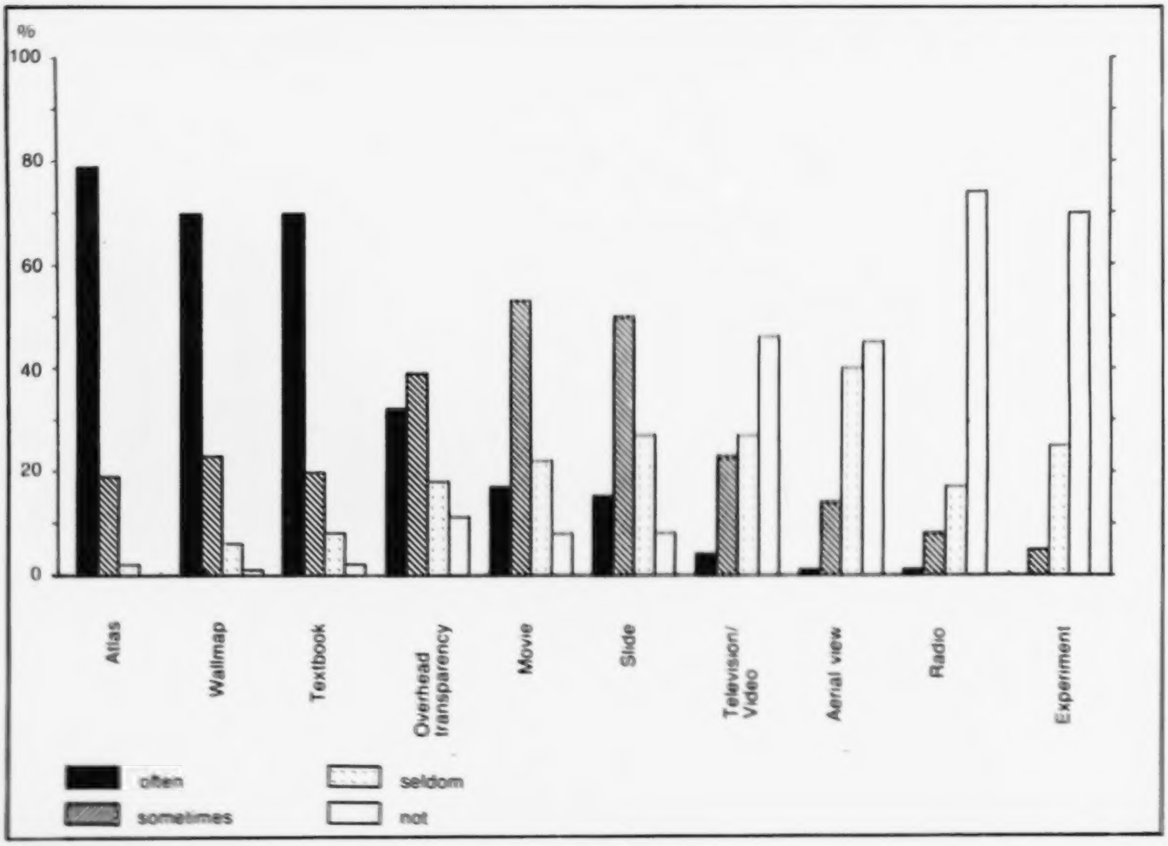


Figure 45.5 The use of various media in teaching geography to Grades 5-10.

emphasized (Niemz, 1980). About half of these field trips were of one or more days, but the rest were mainly conducted as part of project-work (See Figure 45.8). The amount of field work per class varied from a few hours to over twenty hours per year.

Although *the German Geographical Curriculum Research Project* (RCFP) was very effective in achieving its research aims (Schrettenbrunner, 1982) neither this, nor the other research which has been done in the area has had great influence on everyday teaching (Birkenhauer, 1985). Of more than 4000 teachers in grades 5-10 only 16.7% knew about the RCFP, and only 2.8% had used a RCFP teaching unit in their classes. The main reasons for this are that most geography teachers are unaware of the work of the RCFP, and that the schools have to buy the RCFP teaching units, whereas textbooks are usually paid for by the state. The lack of influence by the RCFP may be compared with that of the American HSGP on the actual teaching of geography in American schools (Stoltman, 1987: 324). However, English geography projects such as *Geography for the Young School Leaver* (GYSL) and *Geography 16-19* (Graves, 1982: 96/97), and perhaps the *Australian Secondary Geographical Education Project* seem to have been more successful. This success may be attributed to the emphasis these projects placed on teacher involvement in the curriculum development process (Biddle, 1982: 22).

In most German states, types of schools, and grades, homework is being set regularly (See Figure 45.9). It usually takes the pupil about 15-30 minutes to do these assignments (See Figure 45.10).

In goal-based instruction one should expect the majority of the pupils to achieve most of the goals and consequently better grades in their report cards should prevail. This is not true. In Germany, pupils are given numerical grades from 1-6.

Grade 1 shows the highest attainment and Grade 6 shows complete failure, although it is rarely used. The distribution of more than 150,000 geography grades in report cards shows that the grades allocated approximately to a normal (Gauss) curve. Obviously the majority of the teachers grade their pupils on a group referenced (class referenced) and not on a criterion referenced (teaching objective referenced) basis. Moreover, grades in report cards may reflect not only achievement, but also such factors as participation in classroom activities and quality of homework. Another finding is that boys on average get significantly better grades in geography than girls. This corresponds to the results in geography achievement tests which were presented at the IGU Congress in Paris (Niemz, 1984b). Various possible explanations have been given for this surprising fact, but nothing has been proved so far. The mean score in these tests was about 60%,

Media	Teaching experience in years					
	up to 5 years	5-9	10-14	15-19	20 and more years	over all
Textbook						
often	61.4	68.0	69.5	73.6	69.8	68.2
sometimes	22.2	19.3	19.6	16.8	19.1	19.3
seldom	11.0	9.6	6.2	5.5	6.6	7.7
not	3.8	2.0	9.8	2.3	2.0	2.5
Wallmap						
often	58.3	61.4	68.7	76.4	81.2	68.2
sometimes	28.6	28.3	25.0	16.3	13.2	23.0
seldom	9.0	7.6	4.3	5.0	2.9	5.7
not	2.8	1.9	0.8	0.5	0.6	1.3
Overhead Transparency						
often	42.3	24.8	26.8	24.6	19.8	29.4
sometimes	34.1	37.8	41.7	34.1	30.3	36.5
seldom	13.3	17.4	15.4	19.8	19.9	16.9
not	6.4	6.3	9.5	14.5	17.8	10.2
Atlas						
often	78.7	75.5	75.7	77.9	84.5	77.4
sometimes	18.2	21.2	21.5	17.8	12.7	18.9
seldom	2.2	2.0	2.2	3.3	0.6	2.1
not	0.3	0.2	0.1	0.2	0.0	0.1
Television						
often	2.9	3.5	4.9	3.7	4.1	3.9
sometimes	14.1	22.9	23.2	10.4	17.9	20.5
seldom	22.2	26.2	25.0	25.6	21.3	24.3
not	53.2	39.6	37.1	38.9	40.0	40.5

Figure 45.6 The relationship between teaching experience and choice of media in Grades 5-10.

Teaching method	Percentage of teaching time						
	0	1-5	6-10	11-20	21-40	41-60	more than 60%
Teacher-pupil-talk	5.7	0.1	1.2	7.6	35.9	35.6	13.9
Lecture	17.0	10.4	27.0	26.5	15.6	2.7	0.4
Individual work	19.4	10.9	34.8	27.0	7.5	0.2	
Partner work	32.1	9.4	28.3	23.3	6.2	0.2	
Group activities	36.4	15.5	29.0	15.7	3.4	0.4	
Papers presented by pupils	65.9	16.1	13.2	3.7	0.7	0.1	
Programmed instruction	77.0	14.0	8.0	1.2			
Project work	87.8	5.0	5.1	1.6	0.2		
Games	88.7	4.2	4.0	2.1	1.0		

Figure 45.7 The proportion of total geography time devoted to various teaching methods in Grades 5-10.

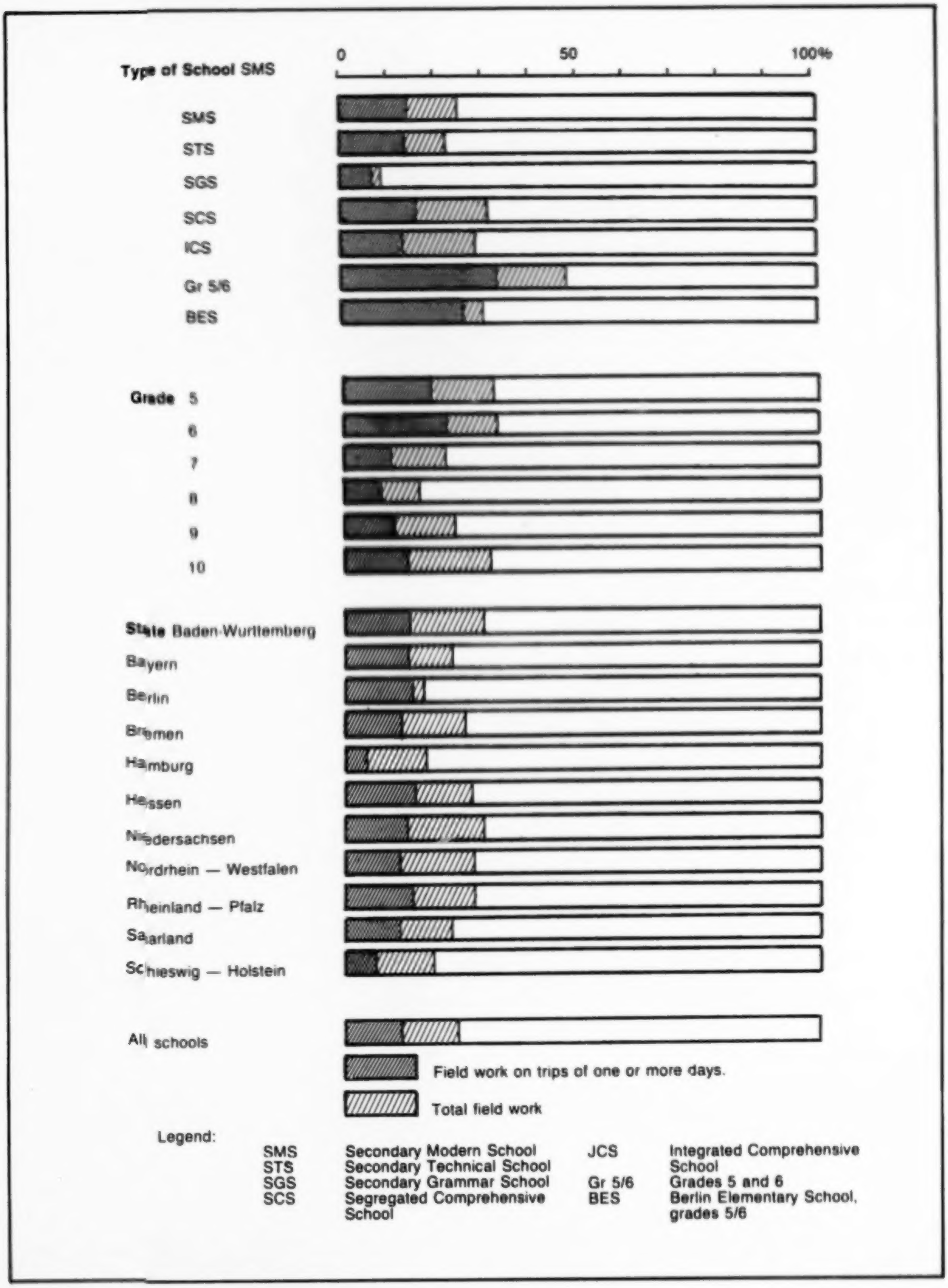


Figure 45.8 The percentage of classes undertaking field work in geography.

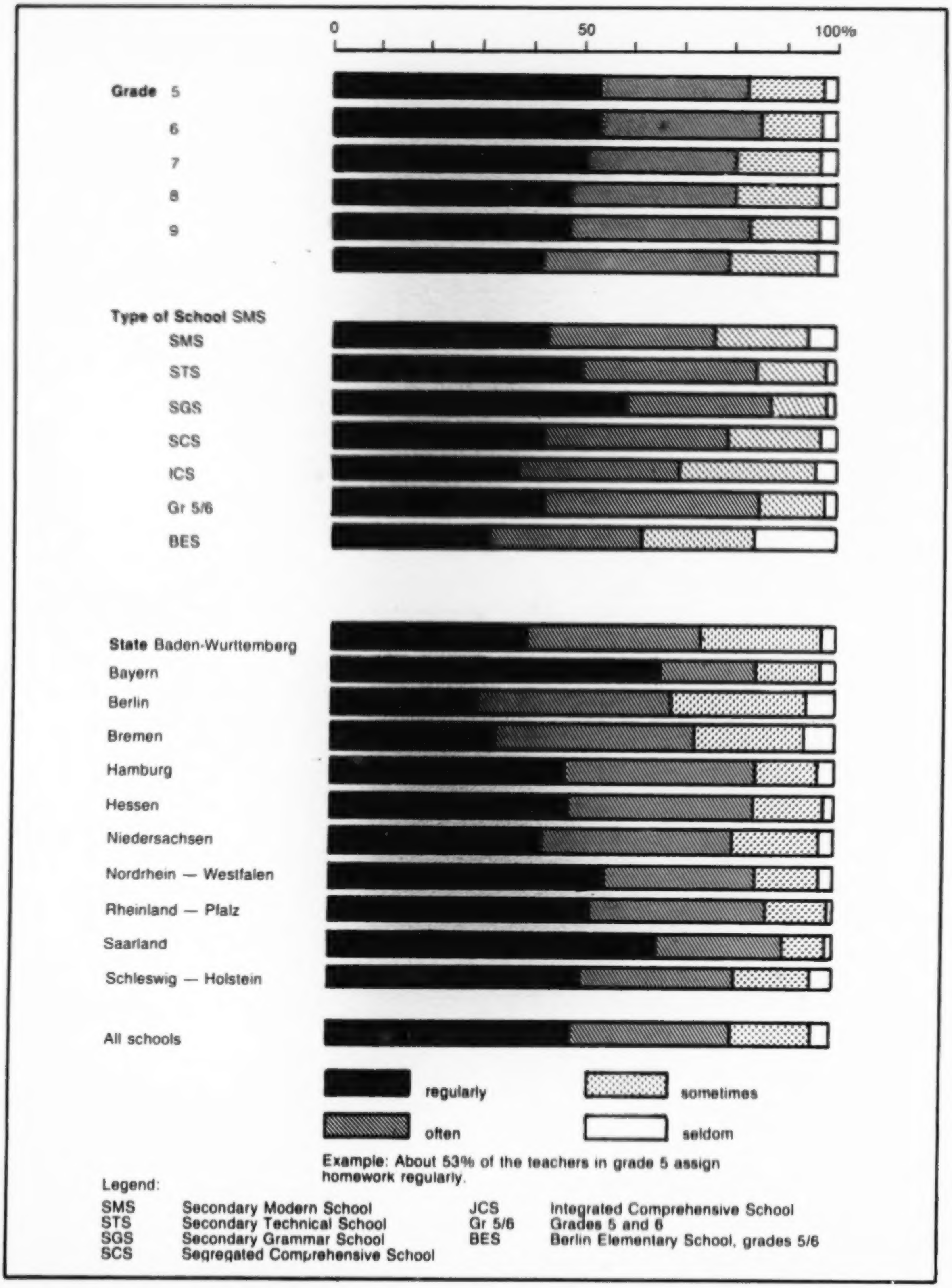
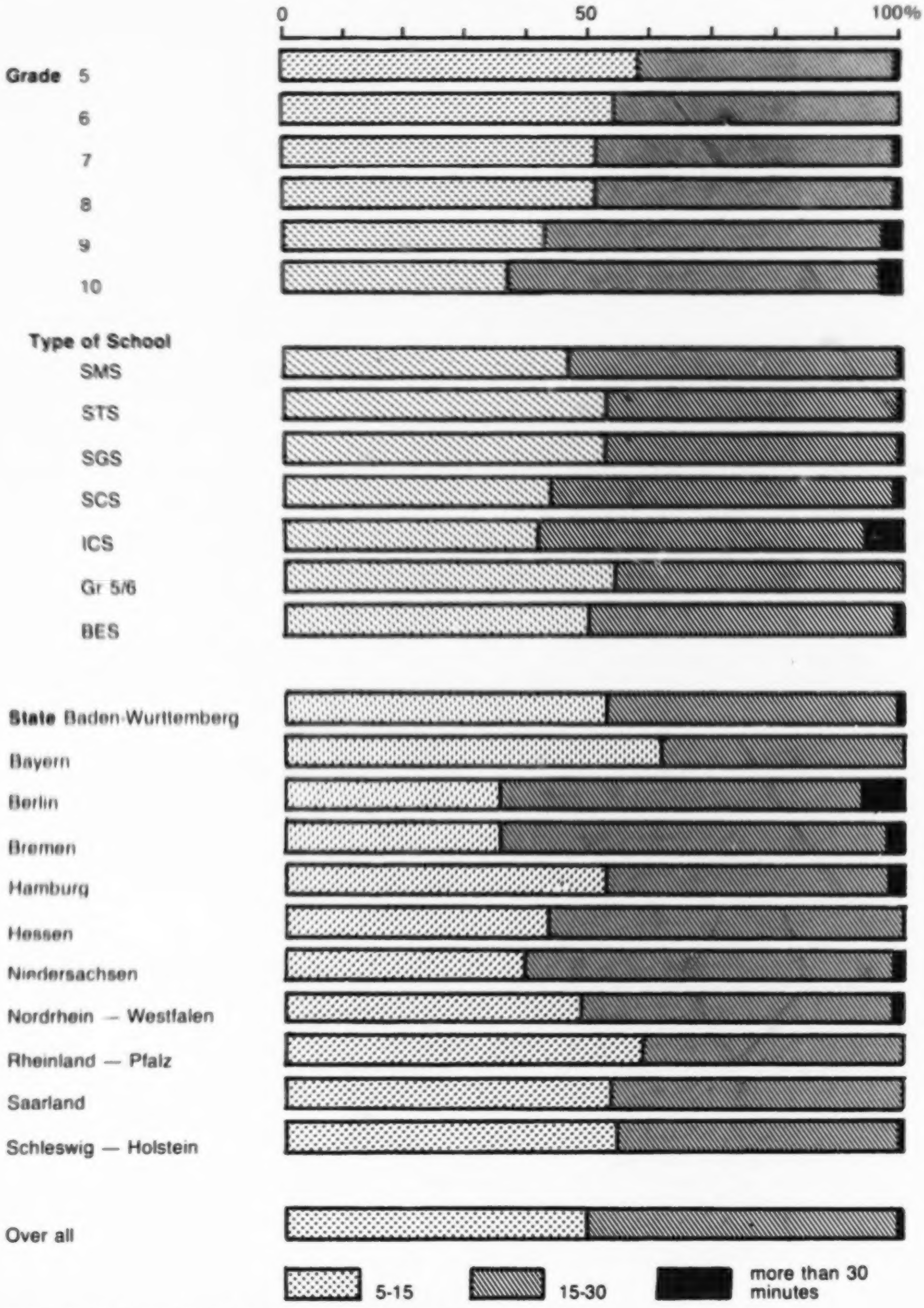


Figure 45.9 The percentage of teachers who assign homework regularly



Example: In almost 60 % of fifth grade clases it takes the pupils 5-15 minutes to do their homework in geography.

Legend:

SMS	Secondary Modern School	SCS	Segregated Comprehensive School
STS	Secondary Technical School	JCS	Integrated Comprehensive School
SGS	Secondary Grammar School	Gr 5/6	Grades 5 and 6
		BES	Berlin Elementary School, grades 5/6

Figure 45.10 The percentage of classes in which pupils devoted specified periods of time to homework assignments.

whereas the mean score in the first international geography achievement test ranged from 40-54% (Stoltman, 1984: 33). Probably the higher average in the German geography achievement tests is due to the fact that these tests are textbook oriented.

Outlook towards the 1990s

It is hoped that the results of this survey will help to improve geography teaching, geography syllabuses, and geography textbooks in West Germany. Although the data referred to here is of West German origin, we should appreciate support from associations of school geographers of other nations (Gerber, 1987), and we, in turn, may be able to help geography teachers in other countries to improve their curricula.

There may be advantages in carrying out similar surveys in other countries to enable us to make international comparisons of geography teaching. Encouraging first steps have already been taken (Haubrich, 1982, 1984, 1987). Quantitative results, as they are presented in this paper, and international geographical achievement tests, which are currently being developed might help to convince school authorities in various countries to improve the teaching of geography in their city or state. Geography educators and teachers of all nations are invited to participate in these projects.

REFERENCES

Biddle, D.S. (1982) "Geographical Education in Australia", in Haubrich, H., *International Focus on Geographical Education*, Braunschweig, 17-17.

Birkenhauer, J. (1970) "Die Landerkunde ist tot. Es lebe die Landerkunde", *Geogr. Rundschau*, 22 (5) 194-203.

Birkenhauer, J. (1985) "Geographiedidaktische Forschungen in der Bundesrepublik Deutschland 1975-1984", *Geogr. Rundschau*, 38 (5), 218-227.

Gerber, R. (1987) "Geography Teaching in Australia in the 1980s", in Haubrich, H. (ed.), *International Trends in Geographical Education*, Freiburg, 26-41.

Graves, N.J. (1982) "School Geography in England and Wales", in Haubrich, H. (ed.), *International Focus on Geographical Education*, Braunschweig, 92-99.

Haubrich, H. (1975) *Westermann Planspiel: Theorie und Einsatz*, Braunschweig.

Haubrich, H. (ed.) (1982) *International Focus on Geographical Education*, Braunschweig.

Haubrich, H. (ed.) (1984) *Perception of People and Places through Media*, Freiburg.

Haubrich, H. (ed.) (1987) *International Trends in Geographical Education*, Freiburg.

Mager, R.F. (1961) *Preparing Objectives for Programmed Instruction*, San Francisco.

Niemz, G. (ed.) (1978) "Geographieunterricht als Projektarbeit', Beiheft, *Geogr. Rundschau*, Braunschweig.

Niemz, G. (1980) "Arbeit vor Ort - unverzichtbarer Bestandteil geographischen Unterrichts', *Geographie und Schule*, 2 (6), 3-10.

Niemz, G. (1984a) "Zur Realitat des geographischen Unterrichts", *Frankfurter Beitrage zur Didaktik der Geopgraphie*, 7, Frankfurt.

Niemz, G. (1984b) *Improving Geographic Curricula by analyzing Student Achievement - a Recent Step in the Evolution of Geography Teaching in Germany*, 25th International Geographical Congress, Paris.

Schrettenbrunner, H. (1978) "Ziele und Grenzen der Programmierung im Geographieunterricht", in Ernst, E., Hoffmann, G. (Hrsg.) *Geographie fur die Schule*, Braunschweig, 92-98.

Schrettenbrunner, H. (1982) "AbschluBbericht uber die Forschungsarbeiten zum RCFP. 18", *Deutscher Schulgeographentag*, Basel, Tagungsband, 290-299.

Williams, M. (1987) "Theory and Practice in Secondary School Geography in England and Wales", in Haubrich, H. (ed.), *International Trends in Geographical Education*, Freiburg, 79-93.

46: IN SEARCH OF A MORE EFFICIENT MENTAL IMAGE OF THE WORLD

Ann Verhetsel

We are confronted with spatial problems in many everyday situations such as when we try to find the way to a new shop or a friend's new house or when we try to find an alternative route to avoid traffic jams in the city. We are also living in an age of rapid and abundant diffusion of information from all corners of the world, although we are only rarely conscious of this. Despite this plethora of information, many of us have only a hazy knowledge of geography. Some people never know where they are, while others are able to solve spatial problems immediately.

Spatial skills, just like other skills, are not inborn. People must be given a chance to acquire them. Downs and Stea (1973: 289-290) emphasized this some time ago, when they wrote: "Orientation, like the weather, is a problem that everyone talks about, but to which no one has a practical solution".

The aim of this paper is to work towards such a practical solution. A study of what our brains do with the spatial information we receive, how we process it, and how we use it is the basis for developing a tuition programme for "spatial education". The intention is not for the students to become walking atlases or newspapers, but for them to acquire the basic skills of making full use of the knowledge they possess (See Figure 46.1).

THE ATLANTIC OCEAN,
THE SUEZ CANAL.
THE BAY OF BISCAY...
THE DARK AGES,
THE GULF OF MEXICO,
NOVA ZEMBLA, ROME
PING!
THAT'S IT.
MY HEAD'S FULL.

Figure 46.1 One approach to the acquisition of factual geographical knowledge

Three sources of inspiration

1. Educational geography

It is in the geography class more than anywhere else that attention is paid to spatial problems and information. "The world in our head" is consequently a fundamental problem for educational geography. We consider educational geography as a form of applied geography, which places the discoveries of academic geography at the disposal of the objectives of education.

2. Cognitive geography

Cognitive geography offers a framework for interpretation which is ideally suited to describing and explaining individual spatial behaviour. It is highly concerned with the individual as a collector and processor of spatial information since individual processing of information is the most important link between spatial reality and spatial behaviour. We have a clear preference for the term "cognitive geography" because the term "cognitive" refers to all the mental processes which take place in our brain: perception, selection, storage and use of information.

Investigations of these processes can help us to solve the problem of how students deal with spatial information and how they solve spatial problems. Previously cognitive geographical research has concentrated primarily on the content of the mental map, for example the preferences and feelings of a group for different environments. Such research has been used in the field of town planning. Our interest, however, lies more in the psychological structures and processes which lie behind efficient spatial ability. Golledge et al. (1985) constructed a model of the factors involved in exploring and becoming familiar with a new environment. We should like to take things a step further and ask which factors are involved in structuring diverse geographical information into a comprehensive mental image of the world.

3. Instructional psychology

As our aim is to develop a concrete tuition programme, we will take into account the findings of instructional psychologists who have recently recognised the importance of subject matter in the learning process. Such workers have, however, limited themselves to simple subject matter such as elementary mathematical and language training (Decorte, 1981). Testing their theory on another and more complex subject matter presents the challenge of learning to build up an efficient mental image of spatial environments.

Organisation of experimental research

Instructional theorists in both the USA and the USSR have recently adopted a similar approach to the study of learning processes. Firstly, the result of the learning process is studied. Result in this context does not mean the performance obtained but rather the way in which the result is achieved (the structure of action). Attempts are then made to understand the development of thought and problem-solving processes. Once these matters are understood, it is possible to consider how those processes can be positively influenced by education (See Figure 46.2).

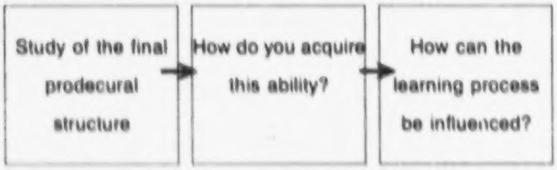

Study of the final prodecural structure
How do you acquire this ability?
How can the learning process be influenced?

Figure 46.2 A simple process model from instructional psychology.

In practice, these research phases are not strictly observed as they are described here. Both Russian and North American instructional psychology integrate the development of a theory and an educational programme in a single research stage as shown in Figure 46.3. "Diagnostic research" considers the way in which students and experts solve the problems with which they are confronted. On the basis of the results of those diagnostic experiments and any data obtained from earlier research (literature studies) a "teaching experiment" is organised. This means that the hypotheses formulated are translated into educational recommendations which take shape in the form of actual lessons. If the learning result of the experimental lessons proves positive, this is considered as confirmation of the hypotheses presented.

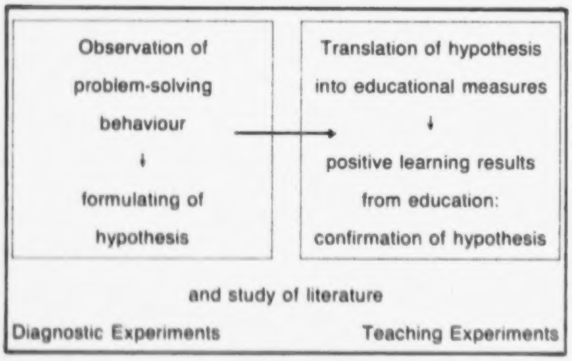

Observation of problem-solving behaviour
formulating of hypothesis
Translation of hypothesis into educational measures
positive learning results from education: confirmation of hypothesis
and study of literature
Diagnostic Experiments
Teaching Experiments

Figure 46.3 The approach to instructional psychology adopted in the USA and USSR.

1. The learning results or structure of action adopted by those able to solve spatial problems efficiently.

Cognitive geographical literature and our own observations have shown that people who are able to solve spatial problems efficiently are able to form an image in their memory which is similar to that of a traditional geographical map. It is on the basis of these mental representations of geographical problems, which we will henceforth refer to as the cognitive map, that they are able to arrive at a useful solution.

However, it is now possible to limit ourselves to the simple metaphor of the map in our head. When we come to consider our own real spatial behaviour consciously, we notice that we do not in fact consult a single mental world map. In different situations with different geographical problems we manipulate geographical information from different cognitive methods of representation. In addition to charts resembling geographical maps we also use extremely simplified charts such as those shown in Figure 46.4 and also simple lists with a sequence of place names. Such charts may be described as expert representations: mental lists of geographical data used to create an efficient geographical representation in the memory on the basis of a specific problem. This expert representation is often analogous to a traditional geographical map, probably because much geographical information loses its value if the spatial dimension is not presented in a suitable manner.

The purpose of encouraging such representations is to develop the ability to form an efficient cognitive map. Part of my experimental research involves testing this concept both through oral interviews and submitting lists of written questions to experts. Research shows that the more experience subjects have of spatial problems, the greater their chances of being able to solve such problems efficiently. Teachers and students of geography (at universities and teacher training colleges) are explicitly involved with spatial problems day after day. The chances of their being able to solve such problems efficiently are therefore greater than any other group. Brilliant solvers of spatial problems are also to be found among groups not professionally involved in geography but they are difficult to track down.

2. Development of spatial thought and structure of action

Piaget has provided us with a detailed description of how spatial representation develops in the memory. However, he works with spatial entities which can be observed at a glance from a single position. The simple translation of his findings into geographical environments by Hart and Moore (in Downs and Stea, 1973) may well be sufficient for simple spatial problems such as finding one's way in an unfamiliar environment. However, geographical environments are more complex than the "space" with which Piaget works. They are larger than the observer himself and it is necessary to integrate observations made at different points in time. Information taken from

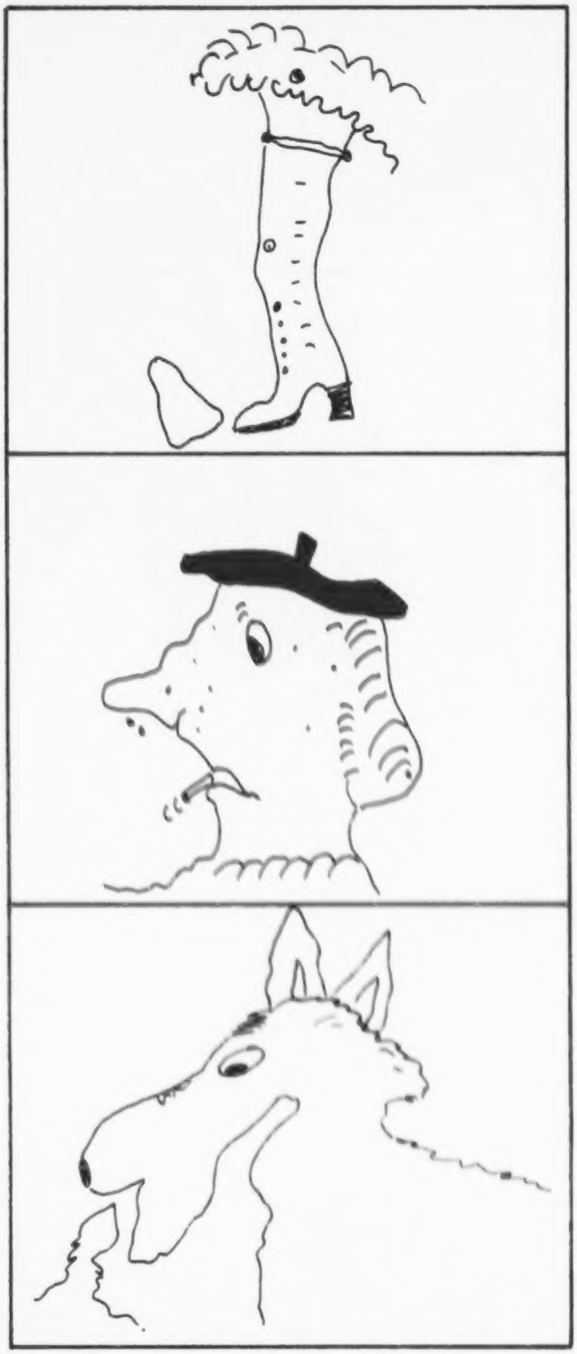


Figure 46.4 Examples of figurative charts.

sources other than the individual's own observations (stories, newspapers, radio, television and of course geography lessons) has to be assimilated into this picture.

We have conducted research on how this cognitive map develops with 12 year olds who have completed primary education and 17 year olds who have completed secondary education.

3. Intervention in the learning process

By defining the final structure of action and outlining the stages of development which result in an efficient cognitive map we have been able to provide a basis for making a number of suggestions for teaching strategies.

Our teaching experiment consists of a course of lessons given to a class of 12 year olds. By carrying out a preliminary test, a final test and a retention test on both the experimental class and a control class, we hope to discover if the lessons increased students' ability to construct a cognitive map. We also asked a group of teachers to incorporate these strategies into their daily teaching and to record their experiences.

Orientation, projection, scale and symbolism: basic concepts for constructing an efficient cognitive map

A study of publications on cognitive and educational geography reveals that the more experience one has of spatial problems the better one's ability is to solve such problems. Aspects of such experience include the subject's age, length of exposure to an environment, most common means of transport and the complexity of the physical environment.

Although problem-solving abilities may be attributed to the amount of active experience a subject has had in a given environment, the question of how the experience is acquired, stored, processed and used must then be asked. It appears that experts can construct efficient cognitive spatial representations. When the general analysis of problem-solving thought from instructional psychology is applied to spatial problems, we may conclude that the spatial representations require familiarity with a number of basic concepts such as the ability to manipulate scale, projection, orientation and symbols. The relationship between the general analysis of problem-solving according to instructional psychologists and these principles applied to spatial problems is shown in Figure 46.5.

In our diagnostic tests we studied the extent to which the test subjects actually understood the basic concepts by studying their approach to a wide range of spatial problems. Our aim was to discover which levels of ability can be distinguished in manipulating scale, projection, orientation and selection of information.

In our teaching experiment we hoped to teach the understanding of basic concepts. This involves shedding light on basic transformations such as the representation of complex areas to scale, changing an individual view point to another perspective, orienting the environment with reference to fixed points, and selecting and abstracting realistic observations for symbolic representation. These concepts were taught using the Gal'perin step-by-step method through which the student is taught to link the basic concept on a mental level through a material and verbal phase.

The nature of the solution to a problem
↓
is determined by
↓
the mental representation of the problem.
↓
This is dependent upon
↓
the grasp of the basic concepts of the problem.

The solution which is applied to a spatial problem
↓
is dependent upon
↓
the cognitive map (= mental spatial representation)
↓
the quality of which is determined by
↓
the grasp of basic concepts such as
↓
scale, orientation, projection, representation of symbols.

Figure 46.5 An analysis of problem-solving thought (top) related to a spatial problem in geography (bottom).

Method: Oral interviews and written questions

Cognitive psychology approaches to geography have traditionally used careful observation, consideration and description. The aim of these approaches has been to structure and categorise the subject as little as possible during the data collecting phase. There is an on-going debate on the validity of this interpretative approach. We are rarely conscious of our cognitive processes so we are not in the habit of discussing such information. The intention of such research approaches is to make that which is invisible to the subject observable to the researcher. Specialists in the cognitive approach continue to view fixing the internal representation as a challenge. This is an indirect approach based on careful observation of discernible behaviour or via external representations such as stories or drawings. The contributions of various and diverse disciplines combined with the individual work of the researchers has resulted in a whole kaleidoscope of research methodologies based on these indirect approaches.

The most widely-used and also perhaps the most misused of these methods is to ask the subject to draw a map of a certain area. This has the great advantage of allowing a large amount of information to be gathered in a relatively simple manner. A major disadvantage is that someone with limited drawing skill cannot do justice to, a perhaps detailed, spatial knowledge. The result is an under-assessment of capacities when the drawings are interpreted. Even for people able to draw well there remain effective and evaluative elements which are difficult to represent on paper. Furthermore, the fact that something is missing does not mean that it is unknown since the drawer may consider it unimportant. In order to allow for possible drawing deficiencies some researchers request the subject to build a model on a large sheet of paper or in a sandpit. Others replace drawings by using a slide, a photo or an aerial shot as the basis for expressing spatial ability. The interpretation of aerial photos is highly suited to our research as we require the same cognitive procedures as are used when plotting a map (change of perspective, orientation, adaptation to the scale and the deciphering of the elements photographed).

People can make observations during a walk. This is however very time-consuming and often difficult to realise in practice. Written questions, on the other hand, often result in a mass of superficial data. We prefer oral interviews during which we present the subject with a number of spatial problems. By recording these interviews on video we are also able to analyse the solving process which leads to the final result. During a second stage we then also use written questions to compare the findings of the interview with the results of a large test group.

Measuring techniques can be misunderstood by the subject and misinterpreted by the researcher. One solution is to combine a series of tests in a single study so that the negative characteristics can be mutually reduced. The data should also be compared with one another when interpreting the results.

We have tried to prepare the tests in as varied a way as possible in order to be able to define the structuring and representational abilities as comprehensively as possible. The tests vary on the following points:

1. The basic geographical concept which needs to be applied: projection, orientation, scale and selection of information.
2. The environment in which the spatial problem is situated: known or unknown.
3. The extent to which the problem is presented in a concrete or more abstract manner: a photo, a story, a map or a sketch.
4. The way of presenting the information: the subjects must listen, read or look at a drawing.
5. The form the answer has to take: the subject must draw, give an account or describe.

Some tests can be easily classified in accordance with these criteria and permit quite a simple interpretation, others are more complex and are similar to day-to-day spatial problems.

Some examples of tests

1. "The round-the-world yachting race"

The following test is used in both the oral interviews and in the written questions and we have already observed that it provides a clear reflection of the thought processes.

A tape is played on a cassette recorder. It describes a round-the-world yachting race. Stylistically, it resembles a radio or television news bulletin. We ask the subjects to listen carefully and not to write anything down. No geographical maps are provided.

This is the story: "At the end of September, 14 boats left for a round-the-world yachting race. They left from Portsmouth, England. They headed first of all for Cape Town, South Africa. The second stage of the race took them around the Cape of Good Hope and 2 months later they sailed from Australia to Auckland in New Zealand. This port in northern New Zealand was the point of departure for the third stage of the competition. After crossing the Pacific Ocean and rounding Cape Horn they reached Punta del Este in Uruguay. From this South American port they set sail for Portsmouth, England where the champagne was waiting to celebrate the arrival of the competitors. On Whit Sunday the Belgian boats came to port in Ostend".

Immediately afterwards we asked the people to relate or describe the story. Only then were they given a geographical map, and asked to mark the route. In addition to the rest points, the map also featured other place names, and parts of South America, Europe and Africa were repeated on both the eastern and western margins. This map is reproduced as Figure 46.6.

This test yields quite a lot of information. We can discover if the test group retains the geographical or non-geographical facts from the news bulletin. Which geographical facts are retained and are they remembered in their correct geographical relationship? How do people react to the map of the world: where do people start and finish, how do they reconstruct the route, how do they react to the duplication of certain parts of the world? How great is the similarity between the account of the route and the route as marked on the map? Does the map provide extra support in reconstructing the yachting race?

2. "Scale" test

Another test which can be presented both as an oral interview and as written questions is based on the maps reproduced in Figure 46.7. Subjects are then asked what these drawings show; in which logical order of sequence would you present them; and why? In this test, maps of the world, Europe and North Africa, Belgium, a Belgian province and an average-sized Belgian municipality are presented to subjects in an arbitrary order. In addition to the outlines of the area each map also features the name of part of that area; the part which will feature on another map included in the test.

The aim here is to test understanding of scale. Is a correct description given of what appears on the map, or does the presence of the name of part of an area cause confusion? Is scale used as a criterion in placing the maps in order? What criteria are used by subjects as the basis for their particular classification?

3. "Europe and Belgium in our head"

Another test concerns the location of a Belgian or European town with reference to Brussels. A compass rose (See Figure 46.8) is printed on the question list, and the question is presented as follows:

"How many kilometres is it between the following towns if you know that the distance between Antwerp and Brussels is 50 kilometres? Also indicate where the first town is located with reference to the second. Antwerp, for example, lies "to the north" of Brussels. If you are not able to locate a town, then put a ring around it.

Brussels - Paris ....km.
Brussels lies to the ....of Paris.
Amsterdam - Brussels ....km.
Amsterdam lies to the ....of Brussels.

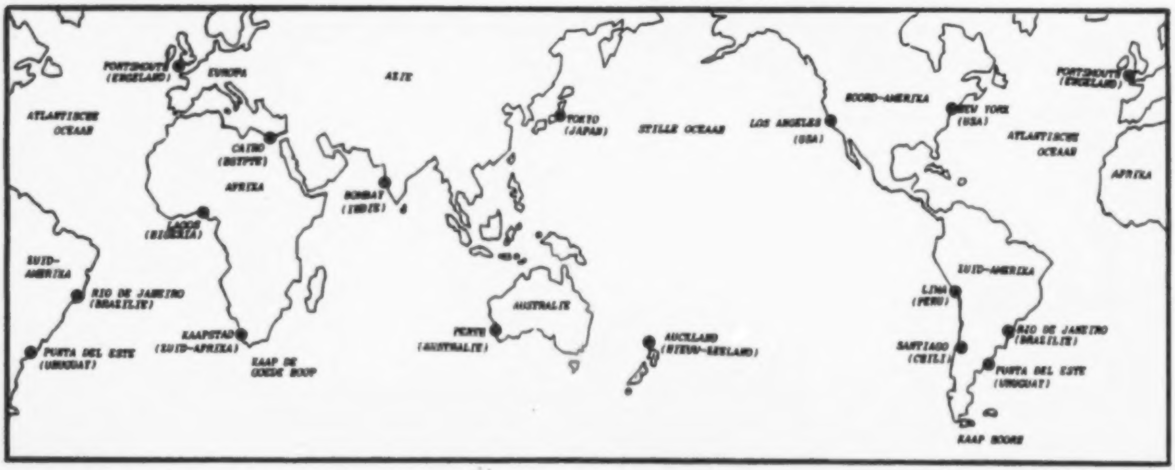


Figure 46.6 The World map provided for the "Round the World Yacht Race"

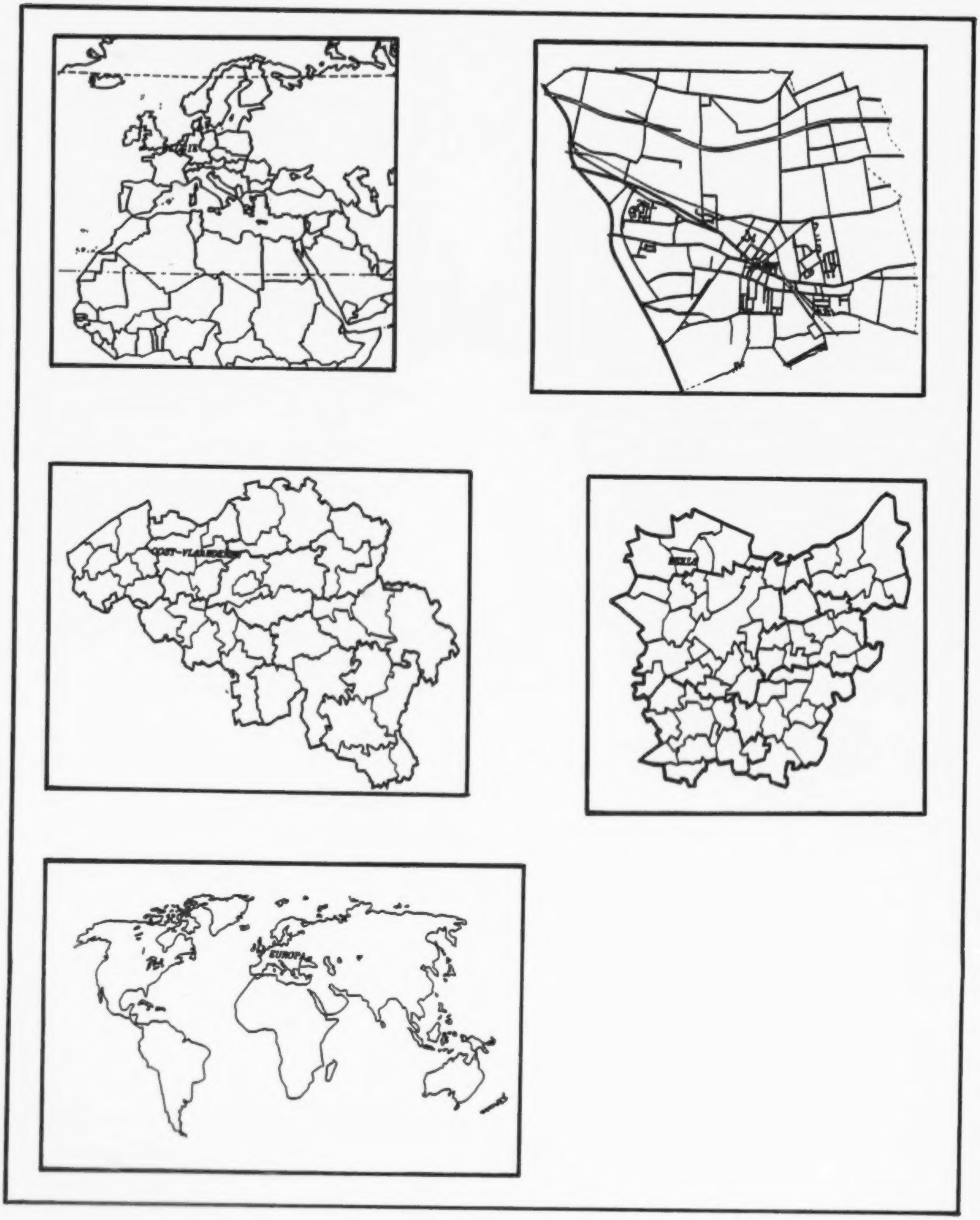


Figure 46.7 The maps from the "scale" test.

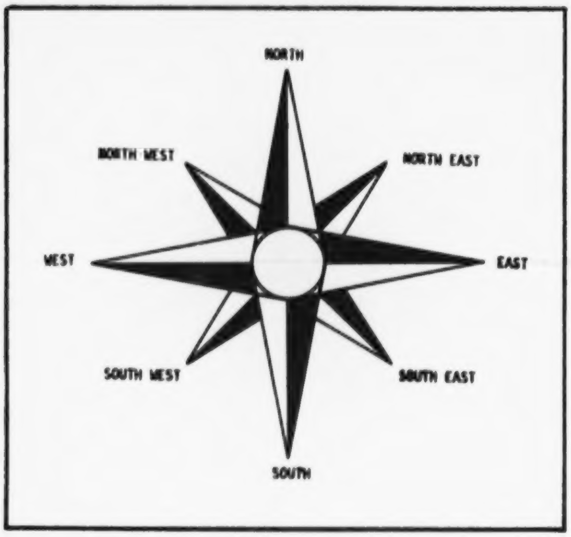


Figure 46.8 The Compass Rose

On the basis of the distances and directions given we are able to reconstruct the cognitive map of Belgium and Europe used by the interviewees. We can also calculate variations from an ideal solution. Consequently we have an answer to the questions:

- Does the interviewee possess an efficient, serviceable cognitive representation of Belgium and Europe?
- Are the variations between this representation and reality greatest for distances or for orientation?
- Are there "black holes" in their knowledge of the area?

Final remarks

I have limited myself in this article to outlining the theoretical starting points and practical content of an experiment in educational geography. The results of this study will be available in 1988.

I can however say something about the practical progress of the research. Trying to define the cognitive map through a series of tests yields some very valuable information. Studying the processes of problem-solving, as is made possible by video recordings, provides a far more detailed and complete picture than is possible by concentrating solely on the final result.

Taking the tests also has a positive effect on the subject, who is motivated to be more attentive to visual or oral geographical information in future. He or she becomes more likely to consult an atlas and consciously to construct a serviceable cognitive map.

Our processing of geographical information is a complex product of development, experience and learning. The environment is a teacher which does not give its lessons out loud. The messages are too subtle to be received and understood by an untrained mind. We believe that we can stimulate geographical information processing in children by adopting the right approach at a young age. All children have the potential for geographical concepts but frequently these abilities are not tapped.

All this merely marks a beginning in the design of a tuition programme in "spatial thought" which is more efficient than that used by Hagar with his dear son as portrayed in Figure 46.9.

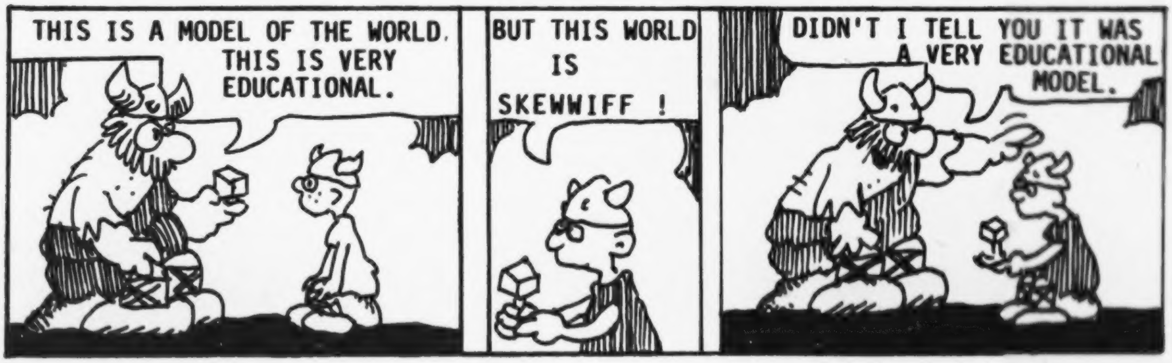

THIS IS A MODEL OF THE WORLD. THIS IS VERY EDUCATIONAL.
BUT THIS WORLD IS SKEWWIFF !
DIDN'T I TELL YOU IT WAS A VERY EDUCATIONAL MODEL.

Figure 46.9 Towards a more efficient image of the world?

REFERENCES

Achilles, F. (1984) "Zeichnungen zur topographischen Sicherung", *Praxis Geographie*, 4, 20-21.

De Corte, E. (1981) *Bijdrage tot de studie van onderwijsleerprocessen*, Leuven, Acco.

Downs, R. & Stea, D. (eds.) (1973) *Image and environment*, Chicago, Aldine.

Downs, R. & Stea, D. (1977) *Maps in minds: Reflections on cognitive mapping*, New York, Harper & Row.

Gold, J. (1980) *An introduction to behavioural geography*, Oxford, Oxford University Press.

Golledge, R., Smith, T., Doherty, S. & Marshall, S. (1985) "A conceptual model and empirical analysis of children's acquisition of spatial knowledge", *Journal of Environmental Psychology*, 5, 125-152.

Goossens, M. (1986) *Didactiek van de Aardrijkskunde, Leuven*, Instituut voor Sociale en Economische Geografie.

Gould, P. & White, R. (1974) *Mental maps*, Harmondsworth, Penguin Books.

Graves, N. (1982) *New Unesco source book for geography teaching*, Longman, The Unesco Press.

Graves, N. (ed.) (1984) *Research and research methods in geographical education*, London, University Institute of Education.

Kuipers, B. (1982) "The "map in the head" metaphor", *Environment and Behaviour*, Vol. 14 (2) 202-220.

Lynch, K. (1960) *The image of the city*, Cambridge, MIT Press.

Moore, G. & Golledge, R. (eds.) (1976) *Environmental knowing: theories, research, and methods*, Stroudsburg, Dowden, Hutchinson & Ross.

Saarinen, T., Seamon, D. & Sell, J. (eds.) (1984) *Environmental perception and behaviour: an inventory and prospect*, Chicago, University Department of Geography.

Verhetsel, A. (1986) "Hoe individuen informatie over het ruimtelijke verwerken", *De Aardrijkskunde, Tijdschrift van de Vereniging voor Leraars Aardrijkskunde*, 3, 179-205.

Verhetsel, A. (1987)" Research in Geographical Education in Belgium: a theme with marginal interest", in Haubrich, H. (ed.), *Theory and practice of geographical education*, Freiburg, International Geographical Union, Commission for Geographical Education, 42-60.

Verhetsel, A. (1987) "Geographiedidaktische Forschung in Belgien: Am Rande des Interesses", *Geographie und Ihre Didaktik*, 1, 31-39.

ACKNOWLEDGEMENT

The Author would like to thank Prof. M. Goossens for his critical reading of the text of this paper.

47: Applied Textbook Research in Geography

David R. Wright

This study is only concerned with forms of 'textbook research' which have a direct bearing on using textbooks creatively and critically. It is concerned with activities which produce new knowledge, and ideas that are directly applicable to teaching and learning. The activities are usable by student teachers and teachers and in some cases by pupils too. Forty years of 'heavy' textbook research has left both teachers and educational researchers largely untouched and unmoved by such activity. These smaller scale studies, that tackle a specific issue, may in fact represent a more meaningful and more useful form of research.

John Milton wrote, in his *Areopagitica*, "I cannot praise .... a fugitive and cloistered virtue". Much textbook research seems to be exceedingly 'fugitive' or 'cloistered' - or even both at once. But the quotation does not deny the virtue of 'pure' research. The best source for such items is the international journal, *Internationale Schulbuchforshung*, from the International Textbook Research Institute in Braunschweig, West Germany. I have argued in the pages of that journal (Wright, 1983) that too much of the research in it is merely 'nit-picking' of 'facts' in textbooks and has too little discussion of issues - but there are exceptions, such as Fien's discussion of the 'Structural Silence' of Australian geography textbooks towards Aborigines (Fien, 1985) - a topic which would never be revealed by conventional textbook research.

This chapter is concerned with 'applied' textbook research, whereby teachers (and student teachers) can be sensitised to such issues as balance, empathy and fairness in textbooks. The concept is of teachers being researchers as a part of their professional commitment to children's education. The activities were developed initially for an interdisciplinary unit on 'Textbooks' in an M.A. (Curriculum) course which I led, and then the activities were further developed for geography teacher workshops in Australia. Because of time constraints, findings are tentative rather than authoritative, but are conducive to further work and further reflection. In that the activities create new findings and new insights, they can and should be regarded as 'research activities'; the potential for research achievement should be clear. Each of the eight topics discussed below uses a different approach towards studying the textbooks. The idea is partly to study each specified topic because it is an important issue in contemporary geography teaching. Equally important, the activities are designed to give practical experience of several types of applied textbook research. In many cases, the method can be used in other contexts. The purpose is to provide new insights and new questions, and to encourage a creative, questioning attitude to textbooks.

Assessing the variety and quality of resources in textbooks

This relatively simple activity produces new insights, and an interesting 'definition' of the scope of textbooks and of geography. Participants need encouragement to recognise a 'distinctive' resource -for example, to classify 'air photograph', 'close-up photograph' etc. rather than just 'photograph'. Similarly 'interview' or 'advertising copy' can be identified rather than just 'text'. The process of recognising and discussing specific resources is more thought provoking if there is no 'checklist' at the start.

The hypothesis can be that newer (and/or 'better') books have a greater variety of resources.

The purpose and value of the resources makes an important discussion topic: in this 'non-threatening' context, teachers are willing to discuss what they see as the value (or otherwise) of each resource. The discussion is thus close to discussion of teaching, but avoids the well known problems of direct discussion of classroom activity.

In workshop sessions, groups of teachers listed resources, and tried to assess the value of each resource. Participants used the structure in Figure 47.1 to record their findings. The contrast between a 'transmission-dominated' textbook, where the much smaller number of resources seem intended only to fulfil the role of 'helping comprehension', compared to an 'interactive' textbook, where all five criteria were involved, drew thoughtful comments from the participants.

Discovering pupil attitudes to textbooks

This activity is surprisingly rare. The words of children and teenagers are absent from reviews of textbooks and evaluations of textbooks. Even in the journals designed for librarians, with their long pages of book reviews, the children's voice is absent. Yet every teacher is able to consult pupils. The invitation to pupils to express honestly, in writing, their likes and dislikes about

RESOURCES in Textbook 1 (list):-							RESOURCES in Textbook 2 (list):-						
List the resources below and TICK the relevant columns:-		DOES IT					List the resources below and TICK the relevant columns:-		DOES IT				
		1	2	3	4	5			1	2	3	4	5
Page No.	RESOURCE	MOTIVATE?	HELP COMPREHENSION?	CHALLENGE PRECONCEPTIONS?	MAKE THE WORLD REAL?	HELP PUPILS TO LIVE?	Page No.	RESOURCE	MOTIVATE?	HELP COMPREHENSION?	CHALLENGE PRECONCEPTIONS?	MAKE THE WORLD REAL?	HELP PUPILS TO LIVE?

Figure 47.1 A structure for analysing the resources in textbooks

textbooks which they have used, is of value to the pupils. The inter-pupil discussion leads to thoughtful and helpful comments being made, as well as strongly critical comments.

I have argued elsewhere (Wright, 1987) that the comments are of great help to teachers too. There are new insights which only children can provide - sometimes by their distinctive 'tournure de phrase', sometimes by the strength of their feelings, and sometimes by the insights they give both into elements that they like and understand -and into what causes their problems, either with unmotivating or incomprehensible elements in a textbook. The workshop activity involved discussion of the implications of comments such as those shown in Figure 47.2

The discussion focussed on:-

1. What are the implications of each of these statements?
2. Can we involve pupils more, in a shared wish to learn? (These pupils seem to want to learn ....)
3. Can we learn from pupils more?
4. Can we invite them to express their views more?
5. Can pupils help us to select textbooks and resource books?
6. Can we invite pupils to review textbooks?
7. Can we share ideas with pupils?

Challenging stereotypes

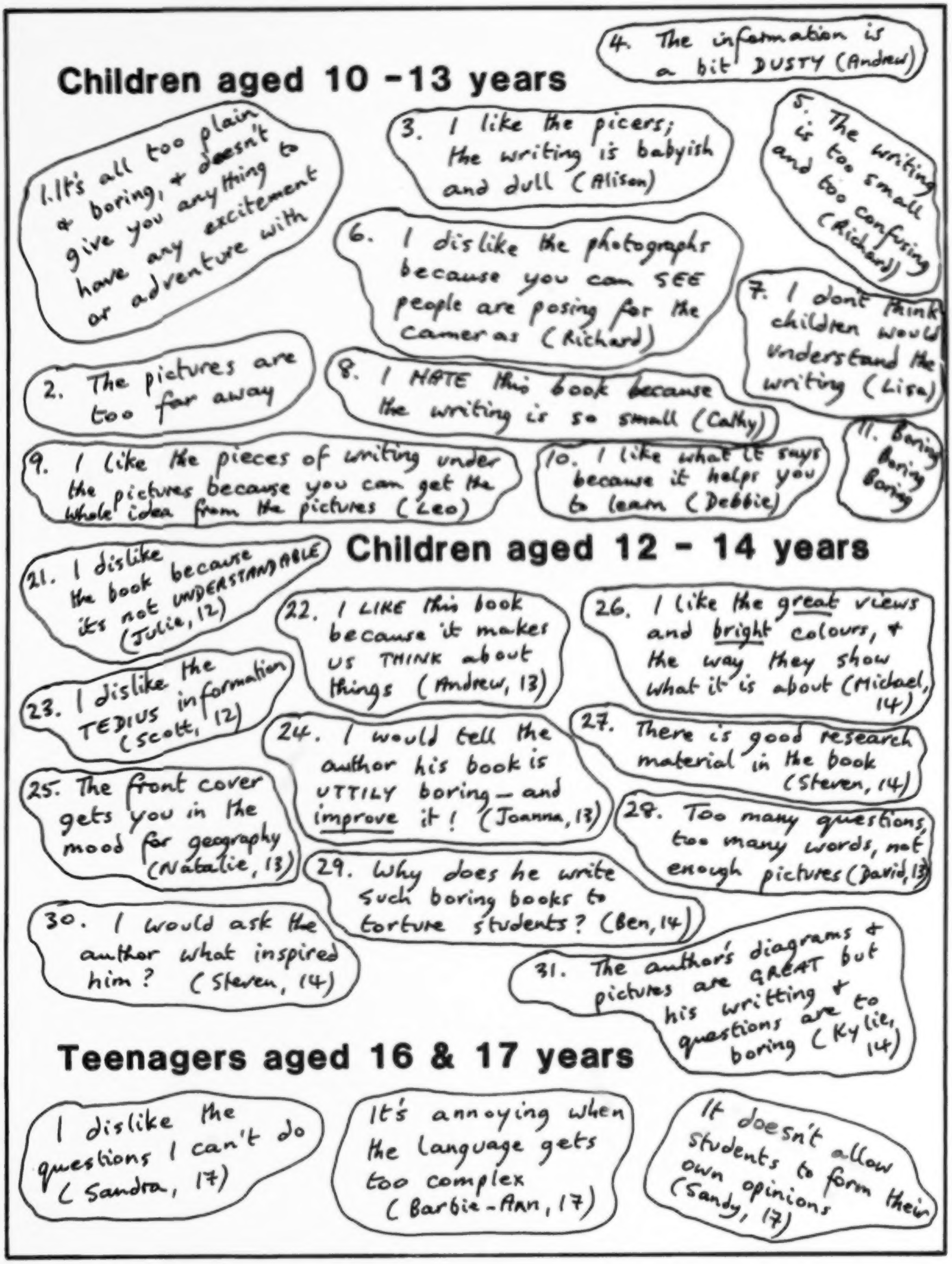
The purpose of this activity is both to study what textbooks portray, and to discuss what a 'stereotype' is, i.e. it is a forum for teacher-discussion, which is based on a shared activity rather than just opinions. It is clear from the section on pupils' attitudes that photographs make a stronger impact on them than the text, so the analysis consists of studying photographs.

For the workshop, the topic was introduced as follows:-

We probably need 'stereotypes', to make sense of the world .... but does our teaching merely confirm students' existing stereotypes (in which case, are we really teaching anything)? Or .... do we challenge stereotypes, with new ideas, new views, unexpected angles? This would be more interesting more educational more worthwhile.)

Participants were then asked to:

- Choose two 'popular' topics such as rainforests, deserts, cities, plantations or industries.
- List the photographs under two headings: Photographs which reinforce stereotypes, and Photographs which challenge sterotypes.
- Compare your results for the two topics.
- Decide on your conclusions .



Children aged 10 -13 years

1. It's all too plain & boring, + doesn't give you anything to have any excitement or adventure with

2. The pictures are too far away

3. I like the picers; the writing is babyish and dull (Alison)

4. The information is a bit DUSTY (Andrew)

5. The writing is too small and too confusing (Richard)

6. I dislike the photographs because you can SEE people are posing for the cameras (Richard)

7. I dont think children would understand the writing (Lisa)

8. I HATE this book because the writing is so small (Cathy)

9. I like the pieces of writing under the pictures because you can get the whole idea from the pictures (Leo)

10. I like what it says because it helps you to learn (Debbie)

11. Boring Boring Boring

Children aged 12 - 14 years

21. I dislike the book because its not UNDERSTANDABLE (Julie, 12)

22. I LIKE this book because it makes us THINK about things (Andrew, 13)

23. I dislike the TEDIUS information (Scott, 12)

24. I would tell the author his book is UTTILY boring — and improve it! (Joanna, 13)

25. The front cover gets you in the mood for geography (Natalie, 13)

26. I like the great views and bright colours, + the way they show what it is about (Michael, 14)

27. There is good research material in the book (Steven, 14)

28. Too many questions, too many words, not enough pictures (David, 13)

29. Why does he write such boring books to torture students? (Ben, 14)

30. I would ask the author what inspired him? (Steven, 14)

31. The author's diagrams & pictures are GREAT but his writting & questions are to boring (Kylie, 14)

Teenagers aged 16 & 17 years

I dislike the questions I can't do (Sandra, 17)

It's annoying when the language gets too complex (Barbie-Ann, 17)

It doesn't allow students to form their own opinions (Sandy, 17)

Figure 47.2 What are the implications for our teaching of each of these comments on school books?

Discovering ethnocentrism

This activity involves challenging statements in a textbook. Workshop participants are invited to offer alternative wording, based on the viewpoint of the people being written about, rather than the viewpoint of the author. In these examples, all the italicized words were challenged (not all in the same workshop). There were also challenges to some of the challenges, and valuable discussion ensued.

"Hunting and gathering is the most *primitive* form of *land use* in the rainforests. The *tribal groups* engaged in this *type of economy* are now found only in the remote areas of the Amazon and *Congo* Basins and the *rugged* upland areas of south and east Asia.

"*Small* tribal groups live in *small clearings* in the forest, in *primitive shelters* made from the products of the forest - leaves, branches and twigs ....

"The daily life of these people consists of an *almost constant search for food.* When all of the suitable game in an area has been hunted out, the *tribe* shifts to another part of the forest. This is *easy*, as their possessions are few and the shelters can easily be taken down and transported, or new ones made at the next village site." (Milliken and Courteney, 1984, p. 132)

"The plantations also provided housing for the *managers* and their staff, and often for the *workers* as well. Other facilities catered for the workers' needs and the requirements of the day-to-day running of the estate." (Milliken and Courteney, 1984, p. 138)

In the context of this book, the activity may look unexceptional and fairly conventional. However, if this is compared with the findings of 'pure' textbook research, a surprising contrast emerges. Much of that work has focussed on 'hard' factual errors, and ignored a much more important aspect: the attitudes in the book. Thus, 'Congo' would be challenged, 'primitive' might not be.

There are also very important implications in teaching. The teachers who still treat geography as 'factual knowledge', and/or whose teaching is dominated by acceptance of a textbook, are challenged by the questioning of the textbook as 'objective truth'. The idea that a textbook may transmit an ethnocentric view of the world is an important finding.

A further implication is that pupils as well as teachers need to be involved in challenging textbooks. 'Textbook Research' is thus not just for researchers, nor yet just for researchers and teachers. The full implications of this idea need a further paper, on another occasion.

'Accidental'(?) racism in textbooks

Many people would feel that racism, along with sexism, are two of the biggest issues facing humankind today. It is therefore to be expected that textbook research would address this issue. Surprisingly 'hard' research has not made the topic prominent, except in the context of textbook treatment of historical issues of race, such as the treatment in history books of the Holocaust in Nazi Germany - a frequent theme in *Internationale Schulbuchforschung*. Because of the importance of the topic, several approaches have been tried. One approach to the study of racism is via "Tracing Continuity and Change in Textbooks". Another is to work from the standpoint of 'empathy': to imagine how pupils with a black skin would feel, when faced with a textbook which ignores empathy (Wright, 1985a). This was undertaken -

1. by study of picture captions
2. by study of the themes shown, and themes omitted, in pictures, and
3. by study of pupil exercises.

In particular, the 'imaginative involvement' exercises - admirable from a pedagogical viewpoint - in the 'South Africa' section of a well-known textbook, revealed a most extraordinary situation: six activities invited pupils to imagine they were white South Africans; no activities invited them to imagine that they were black South Africans. Yet only one South African in seven is white. Other approaches have also been tried, but space forbids a full treatment of this topic.

Discovering sexism in textbooks

A workshop session with student-teachers in the UK involved a thorough analysis of all photographs in 15 modern geography textbooks. The methods used met with approval, and the findings were sufficiently striking to merit publication (Wright, 1985b). The almost complete absence of pictures of women undertaking any creative work or showing any initiative was particularly noteworthy.

In Australia, similar activities were undertaken on specific topics within textbooks, and a series of similar findings emerged. The activity was introduced as follows: "Take a topic from a textbook and list:

- the male activities shown in the photographs;
- the female activities shown in the photographs;
- add a tick if an enterprising, active, activity is shown;
- add up the results; and
- do you think this will affect the self-image, motivation or the commitment of girls in their geography lessons?

A study of sexism can also look at the people in the text. A case study can be particularly revealing. In the Australian workshops, two case studies of Queensland sugar cane farms were considered. The older book (Milliken and Courteney, 1976/84) was found to have ten mentions of 'Mr Mangano'; no one else was named. It is often assumed that newer books are better; workshop participants were interested to discover that the newer book

Attitudes towards the Environment

Do we teach respect for
cooperation with
. . . even love of various environments?

Or do we teach conquest,
mastery, and
destruction of the world's environments?

Activity 1

Look at chapter headings in the textbooks you have brought. Do any fit into these categories? If so, list them.

Respect/Cooperation/Love		Conquest/Mastery/Destruction	
Textbook Name	Chapter Title	Textbook Name	Chapter Title

Activity 2

Do our textbook photographs convey a sense of beauty/fragility of our environments? If so, how? If not, *could* they?

Topic: .... Textbook: ....

Page No. Photo with feel of beauty/fragility, etc. (specify topic)	Page No. Photo with neutral or negative feelings. (specify topic)

Our conclusions are: ....

....

....

Activity 3

Take a *familiar theme* (e.g. cities/desert/forest/farming)

Look through a textbook, after you have 'brainstormed' the group to find the ISSUES you feel should be mentioned.

Issue	Present/Absent in textbook

Conclusions: ....

....

....

Figure 47.3 A structure for analysing text book attitude towards the environment.

(Cox and Bartlett, 1983) had 57 mentions of Mr Peter. His wife was mentioned once - she was 'bringing home the shopping'.

Attitudes towards the environment

Most textbook research is concerned with specific facts and the implications of the facts found. A softer and more open approach can also be appropriate on occasion. In this instance, workshop participants were invited to try a variety of approaches, to see if interesting findings emerged. The approach was successful both in raising new questions and in offering new insights to familiar questions. The structure adopted in the workshop is presented as Figure 47.3.

Tracing continuity and change in textbooks

This is a fascinating activity, more suited to an M.A. course than a teachers' workshop. Old textbooks are held in some university libraries, and some teachers make a hobby of buying and collecting old textbooks.

In a largely unresearched field, some extraordinary findings can be made. For example, the term 'Barbary States' still appears in a textbook currently in print in the U.K. Presumably this has been copied and recopied, from textbook to textbook. The name is a pre-colonial one: it was a name for North-West Africa before the French colonised Algeria in the 1830s, after which 'Barbary' was confined to history -but survived in geography textbooks. A textbook of the 1820s has the question "What is the extent of Barbary?". The textbook still in print asks "Name the Barbary States". One can reflect on how far pedagogy has changed, as well as how far geography has changed.

More alarming discoveries can be made about the treatment of race in geography books. Exactly the same derogatory terms and adjectives for non-whites, and the same complementary words for whites, can be found in a textbook in print today, designed for 16-17 year olds, as were in the Rev. J. Goldsmith's *Grammar of Geography*, of circa 1827. The anthropologists' opinions about race, current before Queen Victoria ascended the throne, and long before the British Empire had reached its peak, are still studied as 'truth' today. If ever there was a case for creative, critical, textbook research, that reaches all teachers, this must surely be it!

Conclusion

I would argue that research activities of this type both can and should be part of initial teacher education, and inservice courses. The research orientation gives students and teachers a feeling of the worthwhileness of the activity, while the focus on textbooks - often the prime classroom resource - ensures that the work is not seen as distant from classrooms, or irrelevant to classrooms - a complaint so often heard about 'education' courses. If we 'preach' discovery learning, our sessions with students and teachers should practise it too ..... Relatively few people are currently actively engaged in 'textbook research' in geography. Yet all participants in geographical education have a potentially useful role in this area. My ideal is that textbooks should be used creatively and critically in classrooms, rather than used in the passive, accepting, manner that characterises so many classrooms. The 'applied research' approach to textbooks could transform not only textbook research, but classrooms as well.

REFERENCES

Cox, B. and Bartlett, L. (1983), *Ideas in Geography, Book 1*, Brisbane, The Jacaranda Press.

Cox, B. and Bartlett, L. (198), *Ideas in Geography, Book 2*, Brisbane, The Jacaranda Press.

Fien, J. (1985), "Structural Silence: Aborigines in Australian Geography Textbooks", *Internationale Schulbuchforchung*.

Milliken and Courteney (1976/84), *Here and Beyond*, 2nd Edition, Sydney, Longman Cheshire.

Wright, D.R. (1983), "International Textbook Research: facts and issues", *Internationale Schulbuchforshung*, 5 (3).

Wright, D.R. (1985a), "In Black and White: racist bias in textbooks", *Geographical Education*, 5 (1).

Wright, D.R. (1985b), "Are Geography Textbooks Sexist?", *Teaching Geography*, 10 (2).

Wright, D.R. (1988), *Turning the World Upside Down: pupils as evaluators of textbooks*, Monograph published by the Social Studies Department, Brisbane C.A.E., Australia.

48: SCHOOL-BASED RESEARCH INTO PUPILS' MAPWORK DIFFICULTIES AND THEIR SOLUTION

Herbert A. Sandford

The research described here was in two main stages: the first was to find out the sort of difficulties school children encountered during their free search of maps and to develop a learning programme to help them overcome those difficulties; the second was to uncover the problems they met in the course of directed search of maps and then to derive data for age-related norms of performance.

Introduction

There are two main ways in which pupils use maps: by directed and by free (or undirected) search. In the former the pupil is set certain tasks such as to find this or to measure that. In the latter the pupil appears to be browsing aimlessly - a very common activity of children, especially with atlases, since they are attracted by the colourful maps and the familiar names.

Directed search is initiated by the teacher. The tasks he or she sets are intended to help the pupils use maps out of school (and after they have left school), and to use them as tools in the study of geography (and social and environmental studies). In practice, however, the teacher may fall into the habit of teaching mapwork for its own sake so that pupils are taught a special school mapwork rather than real-life mapwork.

Teacher-directed search by pupils has come to involve a high proportion of irrelevant tasks conducted in unreal contexts using artificial maps, often mere "map-like-objects" as Petchenik so memorably describes them. Petchenik has also drawn attention to the low validity of such work. Often all that such teaching achieves is to enable the pupils to do better at similar low-value tasks. It is not surprising, therefore, that the areas of difficulty identified by teachers and their solutions have not always been those most relevant to the use of maps as a tool for geography and allied studies or in life out of school.

One solution to this problem is to examine the way in which maps are used by free search. Observation shows that browsing is the most common activity of children with maps and that the maps most often used in this way are atlas maps. This research, then, concerns the free search by school children of an atlas map.

The initial study

The basic requirements of the research were the use of a sufficient number of pupils at school for a year or so and a class set of a suitable atlas map. The present author was at that time the geography teacher in a small school in England and so was able to build his investigation into the curriculum for all 340 pupils using the general map of Asia in the atlas issued by the school.

During an ordinary geography lesson the pupils were asked simply to write down what the map told them about Asia in twenty minutes. By some quirk of the syllabus no pupil had at that time yet studied Asia. Few finished in that time and none limited themselves to Asia since the map, in its oblong frame, included some areas outside that continent. However, these unanticipated events do not seem to have marred the investigation.

The pupils' scripts were scored in every way that seemed to reveal something of the nature of children's mapwork and the problems they encountered, including the amount they wrote, the places they mentioned and the order in which they mentioned them, whether they used the key and scales and the mistakes they made. The results were then inspected to see how they could be analysed for primary scoring and then synthesized into an overall picture of the pupils' mapwork for secondary scoring. Tables, diagrams and maps were used not only to illustrate the results, but also to reveal new aspects of mapwork not readily discernible in the welter of score data. For instance, only by plotting on a map the order in which the children mentioned various places was it possible to find out how they scanned the map of Asia. Figure 48.1 shows the factors which influence the way in which children scan maps. Figure 48.2 shows the order in which the children mentioned various places on the map of Asia.

All research projects require close attention to their validity, reliability and statistical analysis, and this can be off-putting to teachers wishing to conduct their own investigations. In investigations of the type described here, however, the task is eased by using an interpretative test exercise which has construct or built-in validity. Reliability is easily ensured by taking care that the same script can be marked twice (after an interval of time) with the same results. The statistical analysis can be limited to the simplest tabulation of results, calculation of percentages and the like. It is, however, rewarding to find out whether there are any significant differences between, for instance, the number of boys and girls noticing rivers and seas on the one hand, and the numbers noticing mountains and ranges on the other. For this, the powerful yet very simple chi-squared test is eminently suitable.

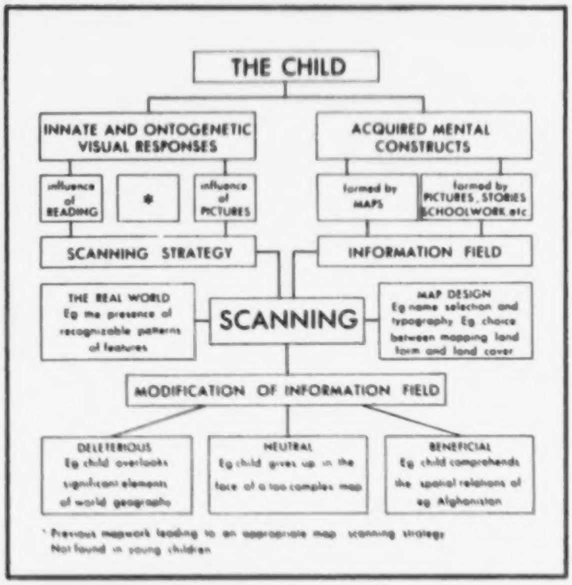

THE CHILD
INNATE AND ONTOGENETIC VISUAL RESPONSES
ACQUIRED MENTAL CONSTRUCTS
influence of READING
*
influence of PICTURES
formed by MAPS
formed by PICTURES, STORIES SCHOOLWORK etc
SCANNING STRATEGY
INFORMATION FIELD
THE REAL WORLD Eg the presence of recognizable patterns of features
SCANNING
MAP DESIGN Eg name selection and typography Eg choice between mapping land form and land cover
MODIFICATION OF INFORMATION FIELD
DELETERIOUS Eg child overlooks significant elements of world geography
NEUTRAL Eg child gives up in the face of a too complex map
BENEFICIAL Eg child comprehends the spatial relations of eg Afghanistan
* Previous mapwork leading to an appropriate map scanning strategy
Not found in young children

Figure 48.1 Factors involved in map scanning by children (Reproduced, with permission, from *The Cartographic Journal*, 17, 1980)

Conclusions

1. The pupils' free search was not aimless but consisted of many diverse, self-imposed, half-or fully conscious tasks and sub-tasks stimulated by the map such as "Where are the biggest mountains?".

2. The tasks imposed by the pupils on themselves resembled those imposed by teachers in directed search and tended to be of a geographical nature. They also resembled the sort of mapwork the pupils would come to employ in later life and in realistic situations.

   For instance, they paid less attention to measuring things and much more to lively and imaginative map interpretation, speculating even upon labour, life and language variably across the continent.

3. The pupils were asked to engage in a series of activities designed to test them on a hierarchy of mapping skills. The central skills were of map reading and map interpretation. Map reading occurs when the map is read literally, as in "There is only one town in Ceylon" (as it was then called) when the map only shows Colombo. Map interpretation occurs when the map is read realistically ("reading between the signs" as Patrick Bailey has so felicitously put it) as in "Ceylon is a land of villages and towns but only one is big enough for the map". Reading and interpretation could be divided between verbal ("Everest is the highest mountain there") and numerical modes ("Mount Everest is 29,030 feet high"). Both proceed by analysing the complex map into its components and then re-organizing them into a new synthesis ("Russia has lots of rivers like the Ob, Yenisey, Lena, Amur, Volga and Syr Darya. These all flow either into the Caspian and Aral basin or else to the oceans"). These processes require both deductive and inductive reasoning ("Karachi is at the mouth of the Indus and so is a port for the valley"; "Many of the ports are nicely put at river mouths in most of the countries").

4. The skills of perception (noticing a bold red line) and apperception (knowing it to be a frontier) are fundamental to all following mapwork and many later errors were due to failure here.

5. The end product of mapwork was a modification (called "accommodation" by Piaget) of the pupil's individual mental image of the world by the assimilation of the new information. This mental image is also a map, albeit a "software" map. It represents the pupils' information and stands at some point between, but not on a direct line between, the paper or "hardware" map on the one hand and reality on the other. The pupils' mental maps helped them to use the paper map realistically, for it gave them a sense of scale. The pupil, for instance, who wrote "India is 40 million miles across" not only could not use the horizontal scale (the scale of the map was given as 1:40,000,000) but had no sense of scale. children who made few errors had their mental maps improved; those who made many errors had their mental maps impaired.

6. The various objectives, skills and activities, described above, which I now call "mediating", can be organized two-dimensionally, not only in the sequence "perception - appreciation - reading - interpretation - assimilation and accommodation", but also allowing for both higher and lower levels of objectives, skills and activities. The higher level skills I call "pervasive" since they are found in every sort of map use.

   Such uses include:

   - finding places and naming places found ("The biggest island of Japan is called Honshu")
   - following routes ("You can go by train all the way from the top to the bottom of Japan")
   - describing patterns ("There are festoons of islands all along Pacific Asia").

   This last example illustrates Hartshorne's expression: "x greater than g", while "Formosa has got mountains in the middle going up a long way and a coastal plain all around it and the Northern Tropic goes right through and it's near China but it hasn't got any towns" - illustrates "g greater than x". The lower objectives, skills and activities are well known and are generally called operational or behavioural objectives since they comprise the basis of everyday teaching and include such tasks as finding Moscow, counting the "coloured" seas (Black, Red, White and Yellow) and reading off the height of Tibet.

Research in programmed learning and ergonomics has identified the many steps needed to undertake even simple mapping tasks such as calculating a distance. These steps are called "iotic skills". The present research contributes little to our knowledge of this area.

7. The main mechanism of free search was by scanning across the map and by conning small areas. The processes of scanning and conning are described later in this paper in the section entitled: Some hints for teachers. In scanning, the pupils often used inappropriate descriptors as when they related the run of the Alpine-Himalayan-Sunda cordilleras in terms of the countries through which they ran (the country names were much more legible than the names of the ranges). In conning, the pupils often described inefficiently through a failure to pick detail from the mesh of point, line and patch symbols. For instance, they described Kirghiz as being in the Karaganda Steppes instead of Karaganda being in the Kirghiz Steppes.

8. An analysis of mapwork books written by teacher-authors showed an overwhelming emphasis on using simple perceptual and apperceptual skills to find and identify various point, line and patch symbols, mostly in order to locate places and to find routes and to a lesser extent to describe patterns and areas. During free search, however, the children were far less interested in symbols and places and much more interested in meaning, in patterns and comparisons, and in acquiring a holistic overview of Asia. To sum up, the children appear to have wanted to attempt more sophisticated and more interesting mapwork than their teachers expected of them. They were also more interested in interpretation than in mere reading, and were loth to calculate and measure precisely, preferring to make swift intuitive assessments as the basis for their interpretations.

The first follow-up study

An express course in mapwork was designed to anticipate and provide solutions to the main problems identified through the free search. This course occupied several weeks of ordinary geography lessons with a year-group of 78 pupils who had already undergone the free search exercise. It consisted of graduated lessons with accompanying exercises, fully directed and of a programmed-learning type. The pupils worked in self-selected pairs at their own pace. Particular attention was paid both to the general areas of difficulty outlined above and to the very specific problems which will be described under the heading "Some hints for teachers" below. It was found that the teaching devices employed acted as "bridges" which crossed the gaps between reality and the maps. Local field work undertaken with topographical maps provided a link with large scale maps while satellite imagery, atlas maps and globes provided the link with reality at small scales.

After the express course, the 78 first-year pupils were given a second free-search test. It was found that they had made so much improvement that these 11 year olds had caught up with the 15 year olds in the general standard and sophistication of their mapwork! The rate of error, already low in free search, was down further, long lists of place names were no longer common in the scripts, and more attention was devoted to well-reasoned interpretation of the mapped evidence of land and life in Asia.

The second follow-up study

The second part of the research sought to establish age-related norms by means of multiple-choice, direct-search test given to a sample of school pupils. Although the method was one of direct search, the tasks set for the pupils were derived from the results of the free search rather than the tasks normally set by teachers and teacher-authors. Direct search here refers more to the method of testing than to the kind of mapwork tested.

2,000 pupils were tested from schools in south-east England and the sample was then reduced to 1,600 in order to produce a representative sample with the correct ratios between girls and boys, the several age-groups, and the various school courses. The nature of the questions devised together with the use of actual atlas maps ensured validity. The objective testing and scoring ensured reliability, and the large sample ensured precision. The atlas publisher, George Philip of London, generously provided the maps needed and the University of London made a small grant. The support and cooperation of many teaching colleagues was essential. Others who might consider similar studies should take heart in that far smaller samples are quite adequate for most purposes provided one does not want to establish norms and one does not need to prove to be significant any smaller differences found between the mapwork of boys and girls, or pupils of different ages, or in their responses to different tasks. A test of this kind required a "job sheet" or table of specification, appropriately weighted, to be drawn up in order to decide how many questions to set on (and marks to allocate to) each kind of skill to be tested. A pilot survey was used to identify any ambiguous wording and any questions which strayed too far from the 50% facility (difficulty) level which would give the most useful spread of scores.

As with the free search, simple chi-squared analysis sufficed for most purposes, though for the special intention of this particular investigation it was decided to further check reliability:

- The rational equivalence method was used to check the significance of variations between the sexes and ages.
- Analysis of variance was used to check the simple parameters.
- Product moment correlation was used to check comparability between work on general maps and that on thematic maps.

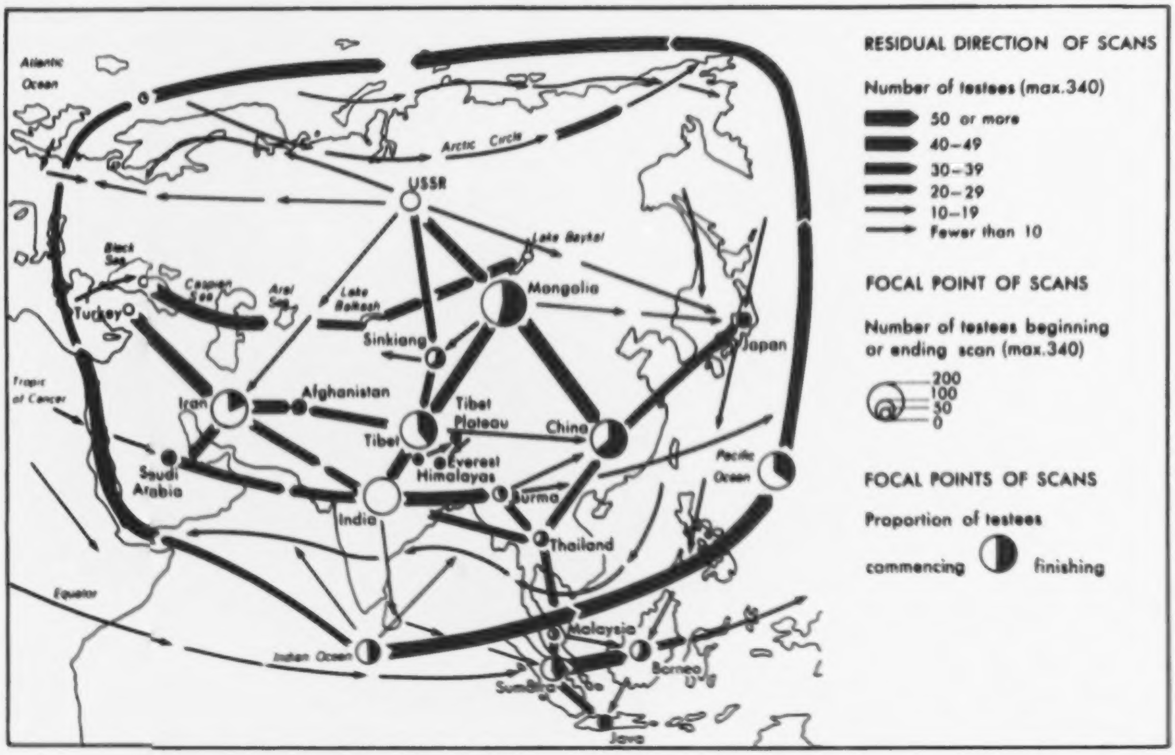


Figure 48.2 The way in which pupils scanned a general map of Asia in a free-search activity. (Reproduced, with permission, from the Cartographic Journal, 17, 1980.) Observe the control exercised by the outer ring of oceans, the inner ring of seas, the Pacific island-arcs, the central Asiatic line of lakes, the Alpine-Himalayan-Sunda cordilleras, the more familiar countries, and certain key parallels of latitude.

- Linear regression was used to check progress from year to year.

Some hints for teachers

In addition to the comments made above, there are a number of other problems experienced by pupils which teachers who wish to undertake this kind of study may encounter. The problems may stem both from the maps themselves and the pupils' interpretation. Problems include:

1. Illogical altitude scales. Most maps use a vertical interval between contours which increases at higher altitudes in order to avoid them coalescing. This causes little difficulty after practice when the resulting scale is strictly geometric but seriously interfers with the ability to imagine the shape of the ground when, as is usual, the scale is partly geometric and partly arithmetic (equal-step).

2. Gradient shading (hill shading). Children tend to see a contoured map as showing the land to rise up in series of steps or terraces, and this impression seems to be reinforced when children are taught to make landscape models out of sheets of such materials as polystyrene. This mistake is less common with maps bearing gradient shading as well as contours or if pupils make models out of a plastic medium and inscribe into its surface.

3. Hypsographic (altitude layer) colours are wildly misinterpreted. Green is often associated with fertility rather than low elevation. The use of the so-called "environmental" maps which are drawn from satellite imagery and purport to show Earth's true colours as seen from space can help to solve this problem. However, one cannot advocate their exclusive use since they cannot entirely supplant physical, political and other maps.

4. Confusion between west and east seems to be as common or more common than that between left and right and is doubtless related to the bilateral symmetry of the human body. It seems that the child must learn this by some mnemonic device. Many children find it difficult to handle compass direction within the frame of a map. They know that north is towards the top but often fail to apply this correctly as they do not appreciate that north is all along the top of a Mercator map of the world but only centre-top on a Mollweide. Direction on a polar projection gives even greater trouble. When a teacher allows pupils to call north and

south, "up" and "down", we can get children believing that "The Ob, Yenesei and Lena flow down from the Arctic Ocean to water the fertile Siberian Plain of Russia"! Such problems can be somewhat ameliorated by encouraging children to make signposts to distant places, every arm of which must necessarily point downwards through the Earth's interior, and by the occasional use of maps and globes "upside down".

5. It is often claimed that children cannot use a complex map and therefore have to be given simple ones, a statement which much be true almost by definition, yet which is invariably misinterpreted as meaning that detailed ones are difficult. Detail is not the same as complexity. A detailed map is more faithful to reality and hence more comprehensible: the more town stamps, the better emerges the pattern of settlement; the denser the contours, the more vivid the three-dimensional appearance of the landscape; the more rivers there are, the clearer can we see the drainage pattern; the more crinkly the coast of Norway, the better we can visualize the intricacies of fjord and skerry.

Complexity comes when a map shows different categories of phenomena, such as relief along with settlements. Even then however the disparate features might be so related as to lie in meaningful juxtaposition so that the map becomes easier to understand despite some increase in complexity. Consider for example, a relief map where the rivers in their valleys provide a single, comprehensible pattern. In such cases, while there must be a meaningful amount of detail, there will be too much if the symbols obscure one another. The extreme of complexity is in the all-purpose general map, which, if the details are reduced so as not to obscure one another, may become too sparse to do justice to any particular phenomenon be it drainage or routes. Because of this, detailed thematic maps can never be dispensed with. Such maps are potentially easier than any superficially simpler map in the sense that only through them is it possible to achieve a mental image close to the real world being portrayed. This may be further illustrated by reference to a complex photo-map which is readily understood by children with only a little practice while the even more complex real world presented to our eyes is simplicity itself!

There are two ways in which someone can reach an understanding of a complete map: conning and scanning. Conning means examining all the map evidence for a series of small areas. This can be done by asking children to imagine what they would do when camping for a few days inside such and such a grid square on a large-scale topographic map, for instance, or rafting down a river such as the Danube on an atlas map. Scanning requires pupils to search the whole map for a particular kind of feature. It requires the child to adopt a particular mental set, an alertness to notice a particular kind of symbol. The symbols may be just the country names and their frontiers.

As the pupil's eyes sweep the map, he or she can build up a picture of these aspects only. The pupils can then repeat the process for another class of feature such as major towns, and if they wish, come to some tentative conclusions about capital cities, regional centres and the like. If pupils adopt one of several logical sequences by which to scan such as coasts, relief, rivers, routes, towns and countries, the inter-relationships between these features will gradually emerge until they can achieve a holistic image of the mapped area.

6. The use of geographical coordinates presents considerable difficulty to children but they are so obviously necessary to any educated school leaver that they cannot be entirely replaced by the alphanumeric or some other system. Latitude and longitude informs us not only of local time, distance and direction, but also of scale and orientation, and even of any distortion brought about by the projection used. Children find that telling the time by the clock is easier, but do so mainly because the hour and minute markers are closely spaced and clearly visible. Only a few world maps bear reasonably close and legible parallels and meridians, but their use accelerates learning geographical coordinates dramatically.

7. Names on maps present further problems but their solution is not easy for the source of difficulty usually lies in faulty design and editorial policy. Horizontal names give the impression of a flat Earth and there is little a teacher can do to obviate this other than encourage pupils to pay attention to the meridians and parallels. In a similar manner one can do little to overcome the problems caused by the names on some maps obscuring the very features they nominate, or the failure to give names to many of the rivers and mountains marked on the map whilst naming every little town however irrelevant to the pupils. Children seldom notice, and even more rarely understand, the significance of the various typefaces used on maps. They merely assume that the more the name stands out from its background, the more important the place is. Even the meaning of "importance" itself is obscure. They are not helped by typefaces being usually omitted from legends, and by the absence of any invariable conventions about them. Children, however, can be encouraged to observe the differences and make their own legend.

There is also a problem in connection with the use of official Russian names for places in Russia, official Chinese names for places in China, official Canadian names for places in Canada, and so on and so forth, when these are different from the names in the pupils' own language. For an English-speaking child this could be the use of Guangzhou for Canton; for a Chinese pupil this could be the use of Oxford instead of Niujin. There is no complete solution to the spelling and pronunciation of these but a partial one is for all pupils everywhere to learn the pronunciations of all the many languages concerned. The alternative is to allow children to continue to use the names of places as they are spoken and written in their own language and culture.

Suggestions for further research along similar lines

The research described in this study has revealed a great deal about childrens' mapwork and how it might be improved even though it has touched on only part of what happens when child and map interface. It has focussed on free search of the general atlas map. The field is wide open for comparable studies of free search of the very many kinds of thematic atlas maps and for general as well as thematic maps at larger scales down to that of the humble street plan. Although there has been much investigation of directed search, especially in relation to large-scale official topographic sheet maps, this is still incomplete and the iotic skills are only now beginning to be studied. Much work has been done on perceptual maps. However, little work has been done on imaginative maps (such as "Draw the island where you would like to be king"), or primary mapping in the form of elementary surveying and secondary mapping (such as drawing a sketch map using an existing map or maps as data). Any teacher can play a significant part in furthering our knowledge in any of these modes of mapwork.

REFERENCE

Sandford, H.A. (1980) "Directed and free search of the school atlas map", *Cartographic Journal*, 17, 83-92.

49: QUESTIONNAIRE SURVEYS IN GEOGRAPHY EDUCATION RESEARCH: SOME PROBLEMS AND POSSIBLE SOLUTIONS

Philip Stimpson

Research in geographical education, and in education in general (Cohen and Manion, 1981), frequently involves surveys of one kind or another. Surveys, in particular questionnaire surveys, are seductive in their appeal. They produce large amounts of data relatively easily; moreover they suggest a "credibility" which comes from breadth of information. Hence the tendency for research students to produce over-long questionnaires. Nonetheless, over time questionnaires have been used to good effect to collect data on departmental resources, fieldwork and classroom practices, innovation adoption and teacher attitude, for example. On the other hand, questionnaire surveys are limited in the sorts of information they can extract. The discussion which follows outlines some of the difficulties and suggests a methodology whereby some of the problems can be avoided.

The pitfalls of questionnaires, particularly from a design and field work perspective, are well documented (Hoinville and Jowell, 1978). Most serving teachers have received questionnaires of undue length, ambiguity of questioning or complexity in response requirements. However, more serious than these weaknesses is the issue of question content and the type of information which is solicited. Essentially, questionnaires are descriptive tools. We would like them to be analytical but analysis only comes about through the interpretations which we impose on the data. Thus explanations can be generated by including, on the one hand, questions which examine the feature of the education system being investigated, and, on the other, questions which enable the researcher to pinpoint the characteristics of some factor, or the elements of some process, which may help to explain the nature of the feature. By correlating changes in the one with the other, some form of interpretative statement is invoked. However, the nature of the research design often leaves us with rather broad and uncertain results. Frequently, as many new queries are raised as existing questions are answered. A better understanding of what is happening and why it is happening may arise but there is often a less satisfactory understanding of how the situation has arisen. In other words, causes and products may be identified, but the process dimension is often missing. Processes are examined by recognising the complex interaction of elements which link factors to features. Such is the complexity of many features of education that we can often only gain glimpses of processes through questionnaires.

For the reasons outlined above researchers often supplement their broad survey work with more detailed interviews in order to gain greater insight. For example, Bramwell (1987: 47) noted, in a questionnaire study of pupils' perception of geography, "interviews would have provided useful information about teaching styles .....". Frequently, because of time and expense, only a small number of interviews can be conducted and so the selection of interviewees becomes critical. The usual approach is to stratify the target population. For instance, in an implementation question it is possible to suggest that differences in behaviour may occur as a result of variations in experience and training. At its simplest level, these two variables will result in four classes of subject. These four classes are illustrated in Figure 49.1.

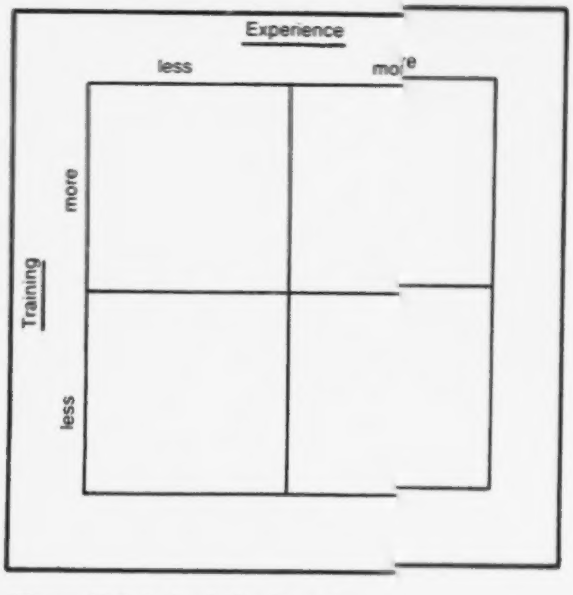


Figure 49.1 A simple 2 x 2 matrix.

The significance of differences in responses by these variables can be tested by the Chi Square or Mann-Whitney statistics or by ANOVA depending upon the data characteristics and limitations of the data. Such analysis is frequently most revealing and can be a source of much soul searching. In many instances, either significant differences do not occur or the differences, although statistically significant, are very small and leave uncertainty concerning the stratification. However, this is probably inevitable. Behaviour, in this case with respect to curriculum implementation, is rarely conditioned by a small number of factors. Training and qualifications are important but they are but two factors. School climate, organisation, leadership, resources and personality are a few of the others. Hence the classification of questionnaire replies by a small number of external criteria may not be successful and, indeed, may lead to spurious conclusions. In the absence of a satisfactory model which defines controls it is preferable to stratify respondents by the responses themselves and to select interviewees accordingly.

This leads to the technical issue of how the respondents can be classified. Each respondent will have his, or her, own response pattern. Clearly the problem is multivariate with classes of respondents representing groups of people with generally similar profiles comprising combinations of responses. Numerical classification through cluster analysis offers a solution to the identification of response groups. This is a widely used technique in substantive geographical studies but little attention has been paid to it in the published geographical education research literature.

In cluster analysis the respondents are clustered (classed) in an hierarchical agglomerative fashion according to their responses. Firstly, the two respondents with the most similar profile of replies are grouped. This is followed by grouping the next most similar respondents or groups or respondents. This procedure is continued until all are grouped together. This is not the only approach to numerical classification (the problem can also be tackled by division) but the method outlined is held by many workers to yield the most satisfactory results. Everitt (1974) has discussed issues of numerical classification in more detail.

The procedure

The first stage is to find an index on the basis of which the similarity between respondents can be judged. A large number of similarity indices abound. A distinction is made between those which are suitable for data measured on a nominal scale (yes/no; class A, B or C) and that which is scaled (1, 2, 3, ...). In the former, data are recoded into presence/absence (1/0) form. Thus class A becomes 1 or 0 as does B and C. Scaled data may also be recoded but there are easier alternatives. For presence/absence data, a similarity index can be computed from:

$$SI = \frac{20w}{a + b}$$

where w is the number of replies to questionnaire items which are the same between two respondents, and $a + b$ are the total number of valid replies given by each of the respondents. The index ranges between 0 and 1, the latter occurring when there is perfect similarity. For scaled data an index is derived from a correlation coefficient. Commonly adopted statistical packages such as SPSS-X and CLUSTAN use the Pearson coefficient by default and in most circumstances this is satisfactory.

The second stage involves grouping individuals. A number of rules reflecting different principles is available to generate clusters but the Ward's method using the least squares rule is generally found satisfactory. At any step in the hierarchical fusion the pair which has the lowest sum of squared deviations from the potential group mean is grouped. This is the error sum of squares or ESS coefficient. The difference in the least square coefficients at any two successive clusters is a measure of the similarity between the clusters in question. If the difference is small, then it is likely that clusters are part of a larger class. Conversely if the difference is large then the clusters represent two distinct classes. Figure 49.2 illustrates this concept. The difference in ESS between the points of fusion of individuals 2 and 3 on the one hand with 1, 2 and 3 on the other is small. It is similarly small for steps in the fusion of 4, 5, 6 and 7. On the other hand the difference in ESS at the fusion points of the two groups is large. Hence two classes would be recognised.

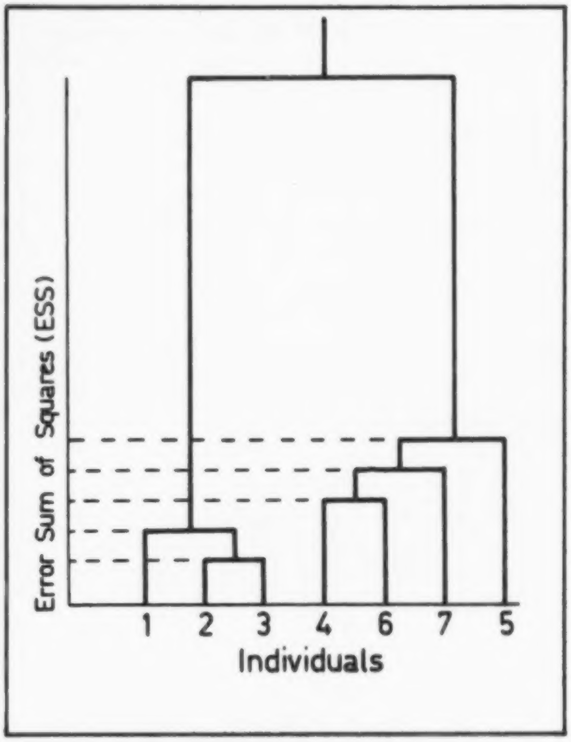


Figure 49.2 A hypothetical dendrogram (cluster diagram) showing relative differences in ESS between and within clusters.

It is clear that the method should not be used unthinkingly since although a number of rules have been constructed (Johnston, 1978) the selection of classes is arbitrary and subjective. Furthermore there is the problem of possible misallocation of individuals. At each step in the agglomeration process, clusters are represented by their mean value. Hence, individuals, who may have been originally dissimilar on only marginal grounds may become progressively separated. Fusion of such individuals usually comes at a late stage and may not always be into the most appropriate class. Inspection of the position of individuals is essential and reallocation

1 The new syllabus has come out because there have been other new syllabuses at other levels.

2 The new syllabus has come out because conceptual changes in geography as a whole.

3 The new syllabus has come out because of changes in the accepted content of geography.

4 The new syllabus has come out because there are changes in teaching methods.

5 The new syllabus has come out because there are changes in the purposes of teaching geography.

6 The new syllabus has come out because of changes in the educational expecations of society.

7 The syllabus has come out because more students now study upto form 5 as a result of 9 years of compulsory and free education.

8 The new syllabus is essentially the same as the existing one with only changes in wording.

9 The new and old syllabuses are basically the same except that ther are small additions of new material.

10 There are differences in content between the old and the new syllabuses but no difference in teaching method is implied.

11 The two syllabuses differ in teaching methods but not in content.

12 The new syllabus is entirely different from the old both in content and implied teaching method.

13 The new syllabus is essentially a compromise between the old traditional geography and the "new" approach.

14 The new syllabus places more emphasis on factual content.

15 The new syllabus takes more care of the less able.

16 The new syllabus places more emphasis on "good citizenship" training.

17 The new syllabus is problem centred.

18 The new syllabus can be described as having a "pattern and process" approach.

19 The new syllabus discards all elements of the old traditional regional systematic approach.

20 The aim of the new syllabus is to provide students with the tools to solve problems in everyday life.

21 The new syllabus is longer than the old syllabus.

22 The new syllabus overlaps with Social Studies and E.P.A. in many respects.

23 There is a loss of geography in the new syllabus.

24 The new syllabus is less academic than the old one.

25 The new syllabus requires less memorisation of facts.

26 The new syllabus is less demanding.

Figure 49.3 The twenty-six propositions concerning the 1985 Hong Kong Certificate Geography Curriculum used by Leung (1985) to assess teacher attitude to change.

should take place if it is considered necessary. If the CLUSTAN computer program is used, incorporation of the RELOCATE subroutine will achieve this.

A case study

In 1985, Leung Wai Kwan attempted to examine teacher perceptions of a new geography curriculum which was about to be implemented in Hong Kong. The new curriculum contained many of the content areas of that already in existence although there were some deletions and some additions. The main change involved an issues perspective which had been included to make the curriculum relevant to a wider cross section of the 17-year old population. Previously the curriculum had been based on the English General Certificate of Education and was directed towards a highly selected academic minority.

A questionnaire was designed to solicit teachers' understanding of the changes which were to occur. The key element of the survey instrument contained twenty-six propositions concerning possible changes. These are listed in Figure 49.3. Teachers were asked to scale their disagreement/agreement with each of the statements using a five-point scale. Other parts of the questionnaire examined what teachers thought would be the main implementation difficulties including time, resources, and background information about the respondent such as age, years of teaching and qualifications.

As expected, the replies to the curriculum perception items were varied but raised queries as to what meaning particular teachers had ascribed to the propositions. More detailed information was needed and it was decided to interview a small number of the 419 teachers who replied to the questionnaire. The teachers were classified according to their response profile using the CLUSTAN suite of computer programs. The resultant classification led to the recognition of two main groups of teachers on the basis of their attitudes to and expectations towards the new curriculum. The way in which the two clusters of teachers were created is shown in Figure 49.4.

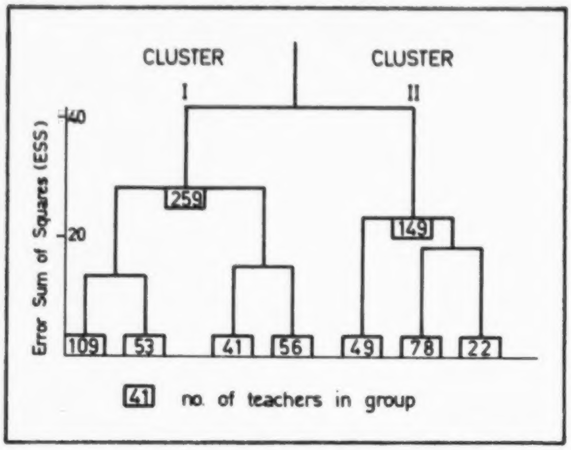


Figure 49.4 A dendrogram to show the classification of the teachers according to their responses to the new curriculum.

Cluster I			Cluster II		
Proposition No.	F	X	Proposition No.	F	X
15	0.65	2.32	5	0.69	3.95
1	0.71	4.01	10	0.70	2.32
26	0.76	2.33	13	0.73	3.48
7	0.79	2.32	18	0.75	3.90
2	0.80	2.40	20	0.77	3.61
24	0.81	2.30	25	0.79	3.46

Figure 49.5 The six most important propositions in the two teacher clusters (after Leung, 1985).

Significant differences between the two main clusters with respect to responses were assessed using the F-ratio. This was derived from the ratio of the variance of response level within a cluster to that for the population as a whole. This is produced as a default diagnostic statistic if the CLUSTAN computer package is used. Responses with low within-cluster variation have small F-values and thus form good diagnostic cluster criteria.

The F-ratios and mean response levels for the six most important diagnostic responses in each of the two clusters are given in Figure 49.5. The mean values reflect positions on a scale from 1 (strongly disagree) to 5 (strongly agree). Hence a mean value of 4.01 for the second variable in cluster II reflects a tendency for teachers in that group to believe that the new curriculum was introduced merely to follow in line with changes in other geography curriculum.

The teachers in cluster I seem rather lack-lustre, neither strongly agreeing or disagreeing with any key proposition apart from the one mentioned in the paragraph above. On the other hand, cluster II teachers seem to view the new curriculum as a response to wider changes in the purpose of teaching geography reflected in a "pattern and process" approach involving less memorisation but directed towards providing useful problem-solving skills needed in daily life. Whilst they also visualise it as a compromise between the old curriculum and contemporary trends elsewhere, these teachers are more positive and are more perceptive in their understanding of change. Consequently, Leung viewed the teachers in cluster II as being more enlightened in the sense that they knew more of, and were more ready to accept, new trends in geographical education. In contrast, he saw the teachers in cluster I as reflecting a more conservative and less informed element in the profession.

Analysis of differences in teacher characteristics (age, years of teaching etc.) between the two clusters using the Chi square statistic revealed that significant differences at the 95% confidence limit or better, only arose with respect to participation at inservice courses. Surprisingly, the "more conservative" teachers were those who had recently taken part in courses. The general absence of differences which might have been expected on a priori grounds gave support to Leung's view that to select interviewees on the basis of the sort of teacher background data normally collected would not have yielded helpful results. As a result, he took a systematic sample stratified by response group instead.

Conclusion

In research situations in geographical education where questionnaire surveys and interviews are deemed appropriate, the approach outlined here is useful but is not a panacea. It cannot, for instance, make up for poor questionnaire design but may complement other attempts to optimise the survey procedure. Above all, the value of a classification based on intrinsic rather than extrinsic characteristics prior to analysis lies in its exploratory nature. By intention it is doubting of accepted, but often unsupported, assumptions. If it finally turns out that the immediately obvious stratification which could have been used was indeed correct, then at least there is evidence to support the decision. On the other hand, if the assumptions are proved to be untenable then unrealistic results may be avoided.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the permission of Mr. Leung Wai Kwan to reproduce the results used in the case study.

REFERENCES

Bramwell, J. (1987) "Pupils' attitudes towards geography in the lower school: an investigation into gender differences", *Geography*, 72 (1), 36-48.

Cohen, L. and Mannion, L. (1985) *Research methods in education*, 2nd edition, Croom Helm, London.

Everitt, B.S. (1974) *Cluster analysis*, Heinemann Educational Books, London.

Hoinville, G. and Jowell, R. (1978) *Survey research practice*, Heinemann Educational Books, London.

Johnston, R. (1978) *Classification*, *CATMOG*, Geo Abstracts, Norwich, UK.

Leung, W.K. (1985) *Teachers' perceptions of the 1989 Certificate of Education Geography curriculum and an analysis of possible implementation problems*, unpublished M.Ed. Dissertation, University of Hong Kong.

50: RESULTS OF THE REFORM OF HIGH SCHOOL GEOGRAPHY TEACHING IN FINLAND AS REFLECTED IN STUDENT EXAMINATIONS

Lea Houtsonen

This study reports the results of research into the outcome of reforms undertaken in the teaching of geography at the high school level in Finland, examined principally from the viewpoint of the student examinations. The reform of geography teaching is regarded here as an educational innovation, the diffusion of which through the Finnish high school system can be traced over the period 1976-85, the time allowed by the educational authorities for the new syllabus to be implemented in schools. The empirical results are thus concerned with the way in which the results of the reform were reflected at the evaluation stage, i.e. in the student examinations

The reform of high school geography teaching in Finland and the diffusion model

The revision of geography teaching, which constituted part of a wider reform of intermediate-level education undertaken in Finland in the 1970s, was strongly influenced by trends in the teaching of the subject in English-speaking countries. Finland has been shown in international comparisons to have been one of the first countries to experiment with the innovative teaching material generated by the *American High School Geography Project* (Gunn, 1972: 19-20). The actual impulse which set the reform in motion was a seminar on the high school geography syllabus arranged by the National Board of Education in 1973, in which contents were assigned to the courses in accordance with the general scheme of aims depicted in Figure 50.1

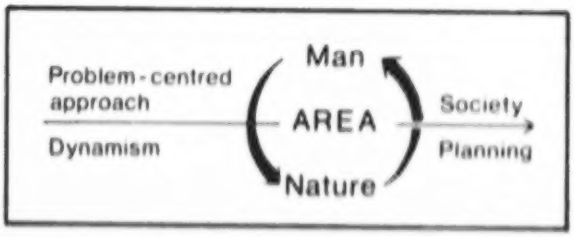


Figure 50.1 General scheme of aims for the teaching of geography in Finnish high schools (Rikkinen, K., 1973, 65).

The strengthening in the position of areal planning as a branch of applied geography from the 1960's onwards has served as a powerful force uniting physical and human geography (Rikkinen, 1982: 364), and the linking of this trend to the revision of the high school geography syllabus is a feature which the reform carried out in Finland has in common with corresponding developments in Federal Germany (Geipel, 1978: 9; Marsden, 1980: 17). This is partly due to the fact that individual university geographers in Finland have had a major influence on the revision of the syllabus at the high school level, by participating actively in the revision work itself and also in constructing teaching materials and arranging in-service training.

A new direction in geography teaching could be detected in the 1975 syllabus and approved by the National Board of Education for use in all high schools. Thus the provisions laid down in the syllabus are national in their scope. The diffusion of innovations is often regarded as taking place more rapidly in centrally administered educational systems than in decentralized ones, even though countries with systems of the latter kind have frequently been the first in which new ideas in geography have made their appearance at the secondary school level (Graves, 1981: 86).

The revision of the syllabus itself was followed by the practical implementation of these new provisions in teaching, in which an important part was played by the publishing of new textbooks, provision of in-service training for teachers and construction of new kinds of questions for the school leaving examinations ("student examinations"). Since teaching materials are of crucial importance for the dissemination of syllabus reforms and the resulting learning processes and achievements, it was essential that such new materials should be available at the very beginning of the reform. The pioneer work in this respect may be regarded as the first new textbook to be written in accordance with the revised syllabus (Aartolahti et al., 1974). This book not only took account of developments in the discipline as a whole but made use of ideas on school geography already circulating internationally. Since participation in in-service training, and also adoption of the new teaching materials in the earlier years of the period studied here, were optional as far as the schools and their teachers were concerned, it is interesting to examine the manner in which this innovation spread and how it was reflected in the student examinations.

The starting points for the construction of a frame of reference for examining the diffusion of the reform (Figure 50.2) consisted of both the features of areal diffusion as defined within geography itself and models for the knowledge utilization process provided by educationalists (Havelock, 1975: 312-328). Thus the teacher training colleges, in-service training centres for teachers, university departments of geography and particularly innovative teachers were regarded as nodes from which the innovation was to spread. It was intended that the new information should be disseminated by all available means including lectures, demonstrations, textbooks, articles in journals and use of the mass media. These means may themselves be taken to represent an innovation network promoting the actual process of diffusion (Adegoke, 1983), especially in view of the acknowledged importance of inter-personal interaction in the diffusion process (Slater and Spicer, 1979).

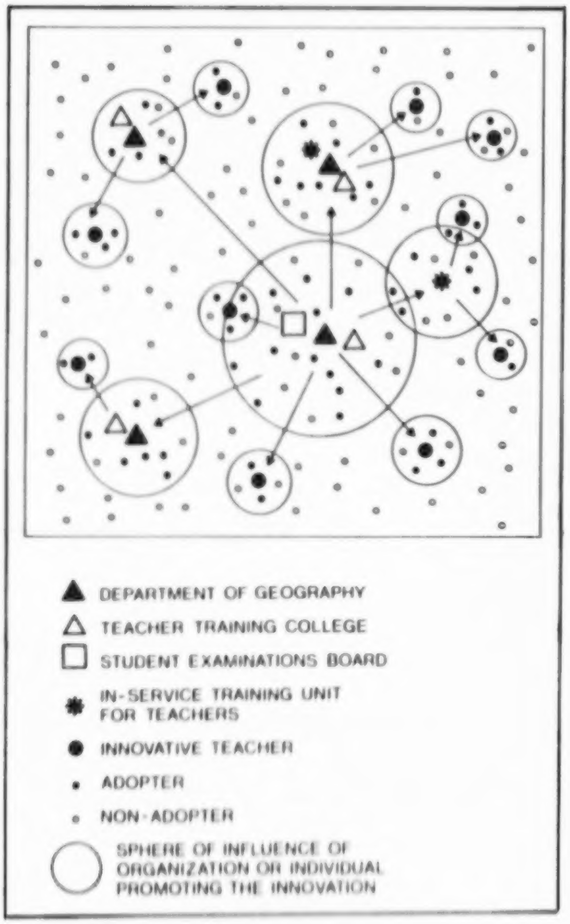

▲ DEPARTMENT OF GEOGRAPHY
△ TEACHER TRAINING COLLEGE
□ STUDENT EXAMINATIONS BOARD
✱ IN-SERVICE TRAINING UNIT FOR TEACHERS
● INNOVATIVE TEACHER
• ADOPTER
∘ NON-ADOPTER
○ SPHERE OF INFLUENCE OF ORGANIZATION OR INDIVIDUAL PROMOTING THE INNOVATION

Figure 50.2 A diffusion model as a frame of reference for the spread of the reform in geography teaching.

Student examination evidence for the diffusion pattern of the reform

The Finnish student examination is a national test taken simultaneously by all those leaving high school in a given year, and its connection with the work done at high school is evident, since both rely for their validity on the same existing syllabus. The Student Examinations Board, responsible for administering these examinations, is appointed by the National Board of Education and is based in Helsinki. The University of Helsinki has a close association with the board, including the right to nominate some members to it.

The Modern Subjects examination is one in which pupils are required to demonstrate their skills and knowledge in questions in the fields of religion, psychology, history, physics, chemistry, biology and geography, the numbers of questions in these subjects being proportional to the numbers of compulsory and optional courses in the high school curriculum. Since the pupils are free to choose the 10 questions which they wish to answer from amongst the above subjects, changes in the percentage of geographical questions answered in the Modern Subjects paper may as such be taken to reflect the effects of the syllabus reform and the reception it has been given in the schools. Meanwhile, the geographical representatives on the Student Examinations Board will have done what they can to promote the reform by taking it into account in the questions they asked.

The principal material on which this investigation is based consists of computer print-outs from the student examination records and the author's own observations made while serving as an assistant examiner on the board. Surveys were also made of the teaching materials used, the teachers responsible for preparing the pupils for these examinations and the extent to which the teachers attended in-service training courses. The data cover all the high schools in Finland, which numbered 506 in 1985. In order to trace the adoption of the revised syllabus and its areal diffusion, the results were also recorded on a regional basis at the province, commune (local authority) and individual school levels, with a further division into urban and rural local authorities made in the national and provincial data. The data were processed by cross-tabulation, correlation analysis and cartographical analysis

The trend in the proportion of geography questions answered in the student examinations showed a clear effect of the revision of high school geography teaching (See Figure 50.3).

The reform obviously met with some resistance in the early years, as the proportion of geography answers decreased markedly in the late 1970s. This feature is evidently connected both with some initial opposition felt by teachers and also with the fact that the pupils were not especially interested in the theoretical approaches and use of quantitative methods which were gaining in emphasis in the student examinations, as elsewhere, at that time. A

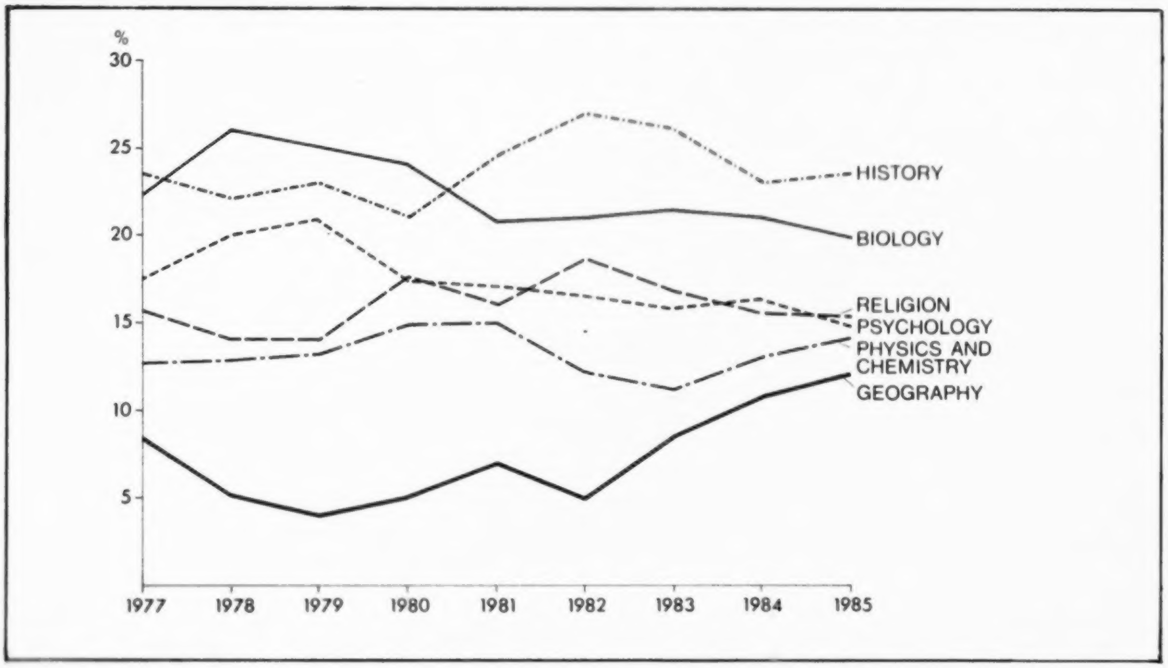


Figure 50.3 Trends in the proportions of questions on the various subjects answered in the student examination Modern Subjects paper in 1977-85.

similar decline in interest in geography as a school subject in response to the "quantitative revolution" has also been noted in Britain (Newby, 1985: 59-60). During the present decade, however, the student examination data show a steady increase in the proportion of geographical questions answered, suggesting improved interest in the high schools, in contrast to the situation in many other countries. This may be looked on as a response to the further development of teaching materials, the in-service training provided for teachers and the attempts made to adapt the questions set in the examination so as to give a better measure of pupils' abilities to apply the knowledge which they have acquired.

The increase in the proportion of answers is also connected with the strengthening in the status of geography as a compulsory subject for all pupils achieved as a result of the advances made in teaching. The geography courses taken in common by all pupils are those entitled "The functioning world" and "Man and his environment". The approach which lays emphasis on the interaction between man and the environment has always been one of the characteristic features of Finnish geographical studies. In addition to these, the pupils can then choose the topic "Functioning regions" as an optional extra course in geography together with a course in regional geography. This course has been developed in the last few years and is based on independent investigations carried out by the pupils themselves. It has proved highly popular, to the extent that as many as 26% of the pupils entering for the student examinations in the academic year 1984-85 chose this optional course. The idea of the course is to choose certain areas in different parts of the world for special study. These areas may be of any size from the village to the global level, the aim being that the pupils should apply the knowledge and skills they have gained in earlier courses to the study of the particular areas which they have chosen for themselves. Pupils can also select their own commune as one area for special study, in accordance with the latest recommendations of the National Board of Education, which encourage schools to establish a dialogue with the society around them, and especially with its cultural and economic life and the natural environment in which it functions. This means that the school should take an active part in developing its local community.

It was also possible to trace a link between the status of geography in the student examinations and a more extensive background, change in general attitudes. Many worldwide and also local problems of a spatial nature have come to shape our attitudes, and these require changes to be made in matters connected with teaching and learning (Botkin et al., 1981). It is evident, for instance, that the integrative, comprehensive way of thinking presupposed in the geographical view of the world is looked on as offering better opportunities for predicting the future and for more efficient participation internationally, nationally and locally. One indication of this in Finland, in addition to the improved position of geography in the student examinations, is the noticeable increase in the numbers of students applying for entry to university departments of geography in recent years.

Closer scrutiny of the questions answered in the student examinations indicates that few attempts were made at answering the more theoretically oriented of the questions based on the new geography syllabus, whereas considerable interest was shown in the questions which required application of the pupil's own geographical knowledge. On the other hand, the poor standard of these answers points to insufficient attention having been paid in the schools to practising the necessary applied skills.

An areal impression of the extent to which pupils answered the geographical questions in the examination was obtained. The increase in the proportion of answers was regarded as one innovation process associated with the overall reform of the geography syllabus. In practice, this trend was most clearly distinguishable in the rise in the proportion of answers from the west of Finland eastwards and from the core region in southern Finland towards the periphery in the north. This pattern is evidently connected with the fact that the principal innovation centres in terms of high school geography teaching, above all, the university departments of geography, are located in the south and west of the country. Helsinki served as the chief innovation centre.

The data on the standards of the answers given indicated that the best results were obtained in certain provinces in the southern part of Finland, although this must be viewed against the general observation that pupils from the south of the country usually fare better in the student examinations than those from the north. This trend in turn is associated with both a general lagging behind in development in terms of school conditions in the north and also the very fact that Northern Finland does not have the same innovative tradition in its education as is to be found in the core areas of the south. The present examination of the answers to the new types of question contained in the Modern Studies paper nevertheless suggest that the greater innovativeness demonstrated in Helsinki, particularly in the early 1980s, would seem to have evened out by the middle of this decade.

The areal diffusion type represented by this innovation is to be seen most clearly from the student examination data for individual schools and local authorities (communes). The early stage in the process is of the hierarchical diffusion type, laying particular stress on the role of the major innovation centres, while towards the end of the period studied here, by which time the reform had spread to the majority of the country, diffusion tended to be of the spatial sequence type, with more emphasis on the role of personal contacts. Of particular importance in the diffusion process were areal concentrations or clusters comprising adoption centres focussed upon towns and their immediate surroundings, or in some case rural areas in which adoption had advanced well in clusters formed by a number of adjacent schools or communes.

Attention was also paid to the adoption of the new geography textbooks in the schools, since a change of textbook was assumed to denote an intention to apply new teaching methods. One factor tending to retard adoption of the new syllabus was found to be the additional study needed on the part of the teacher in order to deal with the topics raised in the new textbooks. Thus in the first few years, a large proportion of the schools adopting the textbooks was located in the larger cities, the proportion located further away from major centres increasing at the later stage in diffusion. This is shown in Figure 50.4. The importance of communication between teachers is shown by the fact that a new textbook was frequently adopted in neighbouring communes simultaneously or in successive years.

A study was also made of the structure of the geography teaching staff and its significance for the spread of the new syllabus. It was considered that the teachers responsible for implementing the new objectives would inevitably be in a critical position as far as adoption in their schools was concerned. Geography is taught in Finnish high schools by senior teachers with university degrees in geography, botany, zoology or genetics. An analysis of the correlation at the level of the individual school between the main subject of the senior geography teacher and the results achieved in the geography questions of the Modern Subjects paper, showed that the mean scores for geography during the first half of the period studied were higher on average in those schools where the teacher had specialized in geography than in those where botany, zoology or genetics were the teacher's main subject. However, these differences had also evened themselves out by the second half of the period. The factors explaining this change were deemed to be the reform in geography teaching and the associated improvement in the status of geography in the high school, while the in-service training provided for teachers must also have played a major part in levelling out the differences in standards. The additional observation that pupils taught by younger teachers tend to be slightly more successful than those taught by older ones may also be connected with the revision of the syllabus. This conclusion gains support from the fact that the former answered questions of the new type more often than did the latter. Similarly, those teachers who had gone on to take a higher degree proved to be more innovative than the others.

An analysis of teachers' participation in the in-service training courses in geography arranged by the Lahti training and research centre attached to the University of Helsinki showed that the participants in the early years were largely from Southern Finland, but that by 1985 attendance had broadened to cover the whole country. Teachers who had attended these courses were found to have adopted a greater number of innovations associated with the syllabus reform than others, and the new textbooks were adopted most often in those schools whose teachers had been on such courses. The results also suggested that teachers' participation in these courses was reflected in improved results for their pupils in the student examinations, and especially in a higher frequency of answering the questions of a more innovative type.

Conclusions

The reform of geography teaching in the Finnish high schools has succeeded in establishing the position of this discipline as an independent school subject which is compulsory for all pupils and in removing the gulf which previously existed between high school and university

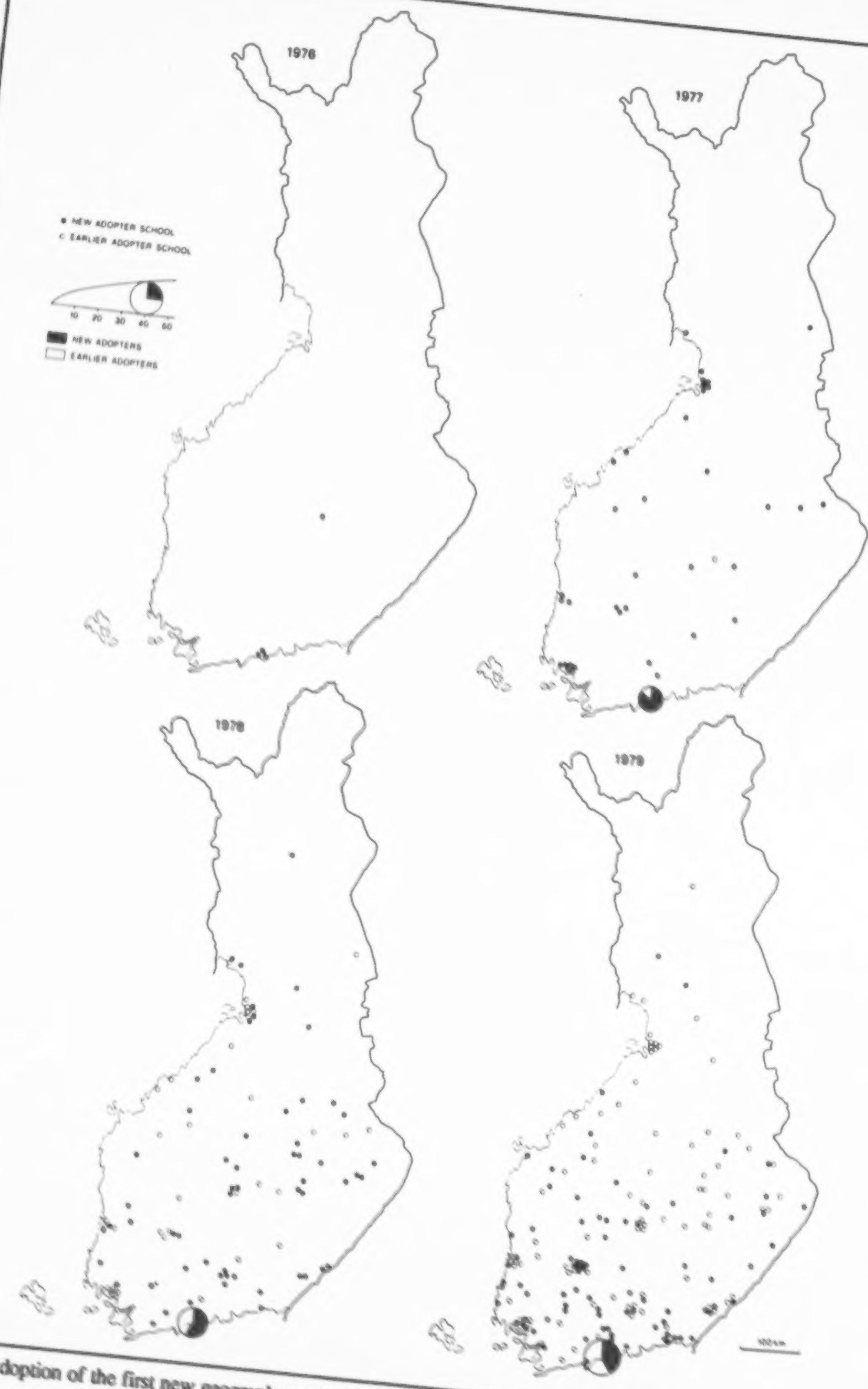


Figure 50.4: Adoption of the first new geography textbook for high schools (Aartolahti et al., 1974) in 1976-79.

geography. The optional course in regional geography also introduced in the reform has similarly proved successful both content-wise and pedagogically. The accent it places upon the skills of applying existing geographical knowledge is in conformity with the objectives laid down for high school teaching as a whole. It has injected more life into high school geography and this has been reflected in the large numbers of pupils choosing this option.

As far as the student examinations are concerned, the effects of the reform are to be seen most clearly in an increase in the proportion of answers to geography questions during recent years, which is symptomatic of a stimulation of interest in geography in the schools. Nevertheless, analysis of the answers themselves showed that much more attention needs to be paid in schools to practising the skills of applying geographical knowledge. This in turn points to the importance of developing new teaching materials.

The centralized school system operating in Finland has helped to promote the efficient spread of the syllabus reform to the schools, and this innovation may be said to have reached the whole of the country within the period studied here, leading to a new consistency in teaching and a stable foundation on which further development may be built.

REFERENCES

Aartolahti, T., Rikkinen, H., Rikkinen, K. and Viitala, P. (1974) *Maantiede lukioita ja aikuisopiskelijoita varten*, Helsinki, Weilin and Goos.

Adegoke, K.A. (1983) "Nodes and networks in the dissemination of new trends in the study and teaching of geography in the Nigerian high school geography curriculum", *Geographical Education*, 4 (3), 124-130.

Botkin, J.W., Elmandjra, M. and Malitza, M. (1981) *Oppimisen uudet haasteet: Raportti Rooman klubille*, Espoo, Weilin and Goos.

Geipel, R. (1978) Ausgangslage, Zielsetzungen und Organisation des RCFP, in RCFP-Forschungsstab, (ed.), *Das raumwissenschaftliche Curriculum-Forschungsprojekt: Erfahrungen und Ergebnisse der Entwicklungsphase 1973-1976*, Braunschweig, Westermann, 5-22.

Graves, N.J. (1981) "International aspects of geographical education", *Journal of Geography*, 80 (3), 84-86.

Gunn, A.M. (1972) "Overview", *in Gunn*, A.M., (ed.), *High School Geography Project, Legacy for the seventies: An analysis of the High School Geography Project in relation to new developments in geographic education worldwide, A report prepared for the International Geographical Union Congress*, Montreal, Centre Educatif et Culturel inc., 7-23.

Havelock, R.G. (1975) "The utilisation of educational research and development", in Harris, A., Lawn, M. and Prescott, W., (eds.), *Curriculum Innovation*, London, Croom Helm, 312-328.

Marsden, W.E. (1980) "The West German Geography Curriculum Project: a comparative view", *Journal of Curriculum Studies*, 12 (1), 13-27.

Newby, P.T. (1985) "The benefits and costs of the quantitative revolution", in Boardman, D., (ed.), *New Directions in Geographical Education*, London, The Falmer Press, 55-62.

Rikkinen, H. (1982) "Developments in the status and content of geography teaching in the secondary schools of Finland in 1888-1977", *Fennia*, 160 (2), 313-383.

Rikkinen, K. (1973) "Geografin i Finlands forandrade skola", *Geografiska notiser*, 31 (2), 61-65.

Slater, F. and Spicer, B. (1979)" Towards an expanded model of curriculum development and diffusion in education", *Geoforum*, 10 (3), 243-249.

51: SCHOOL ATLASES IN THE UNITED STATES: AN ANALYSIS OF CHARACTERISTICS

Joseph P. Stoltman and Robert Freye

The 1980s have become the era of renaissance for geographic education in the United States. The professional societies of geographers in the nation have jointly sponsored publications and teacher development activities directed towards the enhancement of both the image and treatment of geography as a discipline within the school curriculum. National guidelines for geographic education were published in 1984 (Association of American Geographers, 1984), suggestions for the inclusion of geography in kindergarten through grade six social studies curricula were published in 1987 (GENIP, 1987), and a series of teacher development and inservice education activities has been sponsored since 1986 by numerous state and local education agencies and the National Geographic Society (National Geographic Society, 1987). Textbooks and other curriculum materials for geography instruction within the social studies and as subject matter speciality courses have increased in number as publishers recognize the greater attention being placed on school geography. This increased interest has resulted in a renewed attention to school atlases. The use of school atlases is a rarely publicized or researched educational practice in the schools of the United States. However, since 1986 there has been considerable interest resulting in a number of newly printed or revised school atlases.

Purpose of the study

This study examines the characteristics of school atlases that are published in the United States. Sometimes referred to as pupil desk atlases, they are designed for regular use by students in completing skills development activities or supplementing the basic map sections that are included in most textbooks published in the United States. Pupil desk atlases are much less detailed, comprehensive, or voluminous than the traditional reference atlas that should also be available for students to use in a classroom or school library. Only those desk atlases designed specifically for the middle school/junior high school were considered since that is the period when the greatest amount of geography is presented in the social studies curriculum that is generic to the United States. While there are desk atlases prepared for both younger and older students, it was judged that the greatest activity amongst atlas publishers in recent years has been at the grade levels selected for this study.

Design of the atlas study

The analysis of school atlases in the United States has not been a preoccupation of American geographers or cartographers. In fact, there are few reference or resource materials that an atlas selection committee could rely upon for an analysis of student atlases (SSEC, 1987; ERIC, 1987). By far the most thorough and analytical work leading to the development of prototype student atlas analysis systems has been completed by Sandford in the United Kingdom (Sandford, 1983a; 1984). In this study the prototype analysis system developed by Sandford has been followed. In following that model, the present study does not address many of the questions that arise in later stages of the Sandford model.

Sample of atlases

All of the known school atlases published since 1983 for middle/junior high school use were included in the study. Of the fourteen atlases included, several were reprints of earlier atlases that contained minor updates of information and in some cases redesigned maps that added to or replaced earlier map pages. The school atlases included in the study were:

- Hammond Comparative World Atlas (1986);
- Hammond Headline World Atlas (1986);
- Hammond World Atlas for Students (1985);
- Hammond Whole Earth Atlas (1987);
- Heath Student Atlas (1987);
- Nystrom Reference Atlas for Schools (1985);
- Nystrom World Atlas (1987);
- Follett Student Atlas (1987);
- Rand McNally Classroom Atlas (1987);
- Rand McNally Student's World Atlas (1986);
- Scholastic World Atlas (no date);
- Student's Atlas of the World (no date);
- Student's Quick Reference Atlas from Cram (1983).

Format of school atlases

Since school atlases are not considered to be textbooks, their physical characteristics depart from traditional texts mainly in the overall size and in the total number of pages. The dimensions format for eight of the atlases was similar to those of notebook paper used by American students. This is undoubtedly in the belief that a similarly sized atlas fits into the notebook or paper folders that the students use in their studies. Two atlases were smaller and four were larger than the standard 8.5 by 11 inches (21.5 cm x 28 cm) format. The number of pages in the atlases also varied. The shortest had 14 pages of maps and information tables, while the longest atlas had 256 pages. The average number of pages, including maps, gazetteers, indices, title page and textual pages was 77. The costs ranged from US$2.25 to US$8.25 per atlas. There was a general linear association between the cost of the atlas and the number of pages it contained.

Guidance

The explanations of the content and development of skills of reading maps in the atlas are included in the category of guidance. Sandford (1983b) has suggested that an atlas may be classified as "guided" if twenty percent of the material includes self-paced or teacher-directed learning activities in which students are required to apply the information in the atlas. Two atlases in the sample either exceeded or approached the criterion of twenty percent. *The Heath Student Atlas* (1987) devoted seventeen percent to guidance, while the *Rand McNally Student's World Atlas* devoted twenty-eight percent to guidance. It must be concluded that school atlases in the United States have provided little more than pages of maps, with virtually no student-oriented guidance sections to prepare the students to become skilled users of the atlas.

Areal content

Prior analyses of student atlases have addressed the areal coverage presented. In Sandford's words, "it is very right and proper for a child's atlas to emphasize his own country, and when the country's percentage of the areal cover rises to some 20% the atlas can fairly be called nationalistic" (Sandford, 1984: 24). The sample of school atlases from the United States does not depart from this point of view in its representation of the world. The atlases are North American-centric, with that centricity focussing upon the United States. As a group, ten atlases devote more atlas pages to North America than any other region. Europe-centric maps are the next most numerous. It is important to note that other than the North American and European regions, large areas of the world are not allocated individual map pages in a number of the atlases. South America, Africa, and Australia are not presented in a regional context, but only in a world focus in five of the fourteen atlases. This is recognized as a major shortcoming of those atlases. Australia is presented most often in an Oceanic/Pacific Realm context when a separate map page is not included for that continent.

Thematic maps are included in every atlas, although the number of thematic maps varies greatly. The thematic maps tend to follow a specific content focus and few attempt to overload the thematic maps with too much detail. With reference to thematic maps, the following characteristics of the sample of fourteen atlases may be observed.

1. All but one of the atlases have a world political map and a political map of each continent.

2. Three atlases have a relief map of the world, while eleven include relief maps of the continents.

3. Four atlases include climatic maps of the world and/or the continents. They include either climatic classification, rainfall, temperature, or length of growing seasons.

4. Land use and environment maps are included in ten of the fourteen atlases surveyed. These maps are designed to express the relationship between the ways the land is used and the environmental responses of vegetation (or larger ecosystems) to either natural or human-induced conditions.

5. Three atlases represent the cultural aspects of geography in either world or regional maps. These themes vary greatly, but include religion, language, political alignments, and indices of freedom (human rights) expressed spatially.

Tabular information

In addition to graphic representation of spatial information in map form, school atlases also include listings of various types of geographic data. Every atlas includes a table listing land areas. One atlas includes a table for the continents only, while the other thirteen include tables giving area for most of the countries of the world. Similarly, each atlas includes a table listing the population. As with area, one atlas alone includes population by continent, while the remainder provide those data by country. Other types of tabular data reflect the following information: GNP/GDP, Per Capita GNP/GDP, literacy rate, life expectancy, date of independence, population growth rate, languages, political alignment, population density, and religions. When data were appropriate, the tables often provide rankings for the ten largest countries and the ten smallest countries in a category. Nine atlases include the rankings of data and five do not include rankings. Of those atlases that include rankings, the atlas with the largest number has fifteen such ranked tables, while one atlas has only one ranked table.

Tables of national flags are included in four of the atlases, whereas the remaining ten contain no reference or tabular information related to flags.

General information

In addition to maps and tabular information, the sample of school atlases presents additional general information in index, glossary, gazetteer, diagram, and pictorial forms. The index and gazetteer are the most common and are present in all the atlases in the sample. Four of the atlases include a glossary of key terms. Diagrams are included in four atlases and two atlases include pictures.

Conclusions

This survey of student atlases used in the United States represents the first stage of a more detailed examination. On the basis of this first stage, it is possible to draw several general conclusions.

1. There is currently great variety in the coverage and focus of school atlases available to educators for use at the middle/junior high school grade levels. This is a desirable situation on the one hand since it offers teachers the possibilities of a range of choice in selecting an atlas for classroom use. On the other hand, the atlases at the lower end of the range are of uniformly poor educational quality and are in need of major upgrading. *The Heath Student Atlas* (1987) and the *Rand McNally Classroom Atlas* (1987) are both recent publications of high quality. It will be important to observe the degree to which those atlases set a new standard of school atlas quality in the United States. While not radically altered, those atlases represent signs of a forward looking, progressive selection of cartographic and tabular elements.

2. The general maps included in a school atlas tend to focus primarily upon information in political and physical geography. This is marked by a traditional representation of spatial and temporal information in graphic form. Only in a few instances have school atlases in the United States begun to focus on the cover of the earth's surface in addition to the physical shape of the countries and continents. It is imperative that school atlases begin to reflect the fundamental themes for geographic education presented in the *Guidelines for Geographic Education* (AAG/NCGE, 1984). The themes include the human and physical characteristics of place, the relationships between people and the environment, the movement of people, products and ideas, and the analysis of regions and how they form and change. The themes lend themselves well to development through cartographic representation and the school atlas will better serve the key ideas of geographic education when the fundamental themes are addressed. It is anticipated that attention to the fundamental themes will work its way into atlases as new revisions, as opposed to reprintings of earlier atlases, appear in the early 1990s.

3. School atlases in the United States do not yet present the student with self-guided instruction in addition to the guidance that is offered in several of the atlases. The availability to the student of a large amount of information in cartographic and tabular form is dependent on the skills of the teacher or the student in developing a meaningful search strategy to locate and identify information and formulate it into a spatial perspective or enhanced mental map of a region or the world. The student atlas instruction components developed by Rand McNally are examples of instructional modules at the elementary and secondary grade levels that guide the student in atlas usage (Fletcher and Reque, 1986; Stoltman, 1987).

The data from this initial survey of school atlases for the middle/junior high school grades have revealed some common characteristics, several major differences, and emerging new trends in school atlases in the United States. They also verify that school atlas analysis is a critical research need during this period of renewed emphasis on geographic education in the schools of the United States.

REFERENCES

AAG/NCGE (1984) *Guidelines for Geographic Education: Elementary and Secondary Schools*, Washington, D.C., Association of American Geographers.

Fletcher, J. and Reque, B. (1986) *Exploring Geography: Using the Atlas*, Chicago, Illinois, Rand McNally and Company.

GENIP (1987) K - *6 Geography: Themes, Key Ideas and Learning Opportunities*, Macomb, Illinois, National Council for Geographic Education.

National Geographic Society (1987) *UPDATE*, Washington, D.C. No. 9. ERIC (1987) Resources in Geography, Social Science Development Center, Bloomington, Indiana.

Sandford, H. (1983a) "Criteria for Selecting a School Atlas", *Teaching Geography*, 8 (3), 107-108.

Sandford, H. (1983b) "Typology and Characteristics of Pupils' Desk Atlases", *South African Journal of Photogrammetry, Remote Sensing, and Cartography*, 13 (4), 217-226.

Sandford, H. (1984) "A Comparative Description and Analysis of Current South African Pupils' Desk Atlases", *South African Journal of Photogrammetry, Remote Sensing, and Cartography*, 14 (1), 19-36.

Stoltman, J. (1987) *Rand McNally Goode's World Atlas Place Location Study Guide*, Chicago, Illinois, Rand McNally and Company.